

30 June 2011

Free Phase Petroleum Hydrocarbon Investigation Report

**Former CENCO Refinery
12345 Lakeland Road, Santa Fe Springs, CA**

**SLIC No. 0318, ID No. 2040071
CAO 97-118**

Prepared on Behalf of

**Isola Law Group, LLP
Lodi, California**

Prepared for

**Regional Water Quality Control Board
Los Angeles Region**

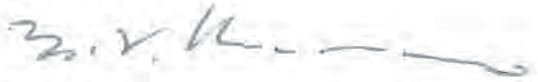
Prepared By

I, Michael Barranco, do hereby declare, under penalty of perjury under the laws of the State of California, that I am the Environmental Coordinator for Lakeland Development Company, that I am authorized to attest to the veracity of the information contained in the report described herein, and that the information contained in

Free Phase Petroleum Hydrocarbon Investigation Report, dated June 30,2011

is true and correct, and that this declaration was executed at Lakeland Development, in Santa Fe Springs, California on June 30, 2011 .

Signed,

A handwritten signature in dark ink, appearing to read 'M. Barranco', followed by a horizontal line.

Michael Barranco

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1. INTRODUCTION

On behalf of Isola Law Group, LLP, Murex Environmental (Murex) has prepared this *Free-Phase Petroleum Hydrocarbon (FPPH) Investigation Report* for the Lakeland Development Company (Lakeland) for its former refinery located at 12345 Lakeland Road in Santa Fe Springs, California (site; **Figure 1**).

The Regional Water Quality Control Board, Los Angeles Region (RWQCB) requested a free-phase petroleum hydrocarbon (FPPH) investigation in a letter dated April 3, 2007 to enhance delineation of the FPPH plume. ARCADIS prepared a workplan to conduct a FPPH investigation which was submitted to the RWQCB August 2007. The workplan was subsequently approved. The investigation approach prescribed the use of the Rapid Optical Screening Tool (ROST) to evaluate the presence of FPPH. ARCADIS completed nine of the original 12 proposed locations (three locations were inaccessible on the property of the Metropolitan State Hospital due to construction at that time) and presented the findings to the RWQCB.

In 2010, the RWQCB issued a letter to Lakeland Development Company titled, "Requirements for Subsurface Investigation and Cleanup Pursuant to Cleanup and Abatement Order No 97-118, Former Powerine/CENCO Refinery" (**Appendix A**). Murex submitted a workplan to complete the FPPH investigation titled "*Regulatory Update – FPPH Investigation Status*," which was approved by the RWQCB in a letter dated February 15, 2011 (**Appendix A**).

This report summarizes the findings of the historical ARCADIS investigation and the more recent work. This report also provides a summary of FPPH investigation methods, results, and findings.

1.1 Purpose

The main objective of the recent FPPH investigation efforts was to complete the assessment conducted by ARCADIS in 2009. The intent of the investigation was to delineate and quantify the amount of FPPH that exists within the soil and groundwater. Historically, FPPH contamination has been measured in monitoring wells on and downgradient of the former CENCO facility.

2. SITE BACKGROUND

Site description, facility operational history, and site geology and hydrogeology are presented in the following subsections.

2.1 Site Description and History

The site is approximately 55 acres in size and is bordered to the north by Florence Avenue, to the south by Lakeland Road, and to the east by Bloomfield Avenue (**Figure 1**). The Site is bordered on all sides by commercial and industrial properties. The site was operated as an oil refinery from the 1930s until July 1995. Historical aerial photographs indicate that the western portion of the site may have been used for agricultural purposes from approximately 1928 to 1938. Oil-production-related structures such as ponds and aboveground holding tanks may have also been located onsite during these years (Haley & Aldrich, Inc. [Haley & Aldrich], 2005). The refinery is not currently in operation; however, some of the refinery structures remain onsite. These structures are scheduled to be removed prior to the redevelopment of the property for commercial/industrial use.

Previous refining operations included processing crude oil into several grades of fuel including kerosene, leaded gasoline and aviation fuel, unleaded gasoline, jet fuel, high and low-sulfur diesel, fuel oil, and petroleum coke. Soil and groundwater quality beneath and in proximity to the site have been impacted by past site operations. Soil and groundwater investigations are being conducted pursuant to two CAOs (Nos. 85-17 and 97-118) issued by the RWQCB to Powerine Oil Company (CENCO Refining Company) in 1985 and 1997 (Haley & Aldrich, 2005).

2.2 Geology and Hydrogeology

2.2.1 Regional Geology and Hydrogeology

The site is located within the Santa Fe Springs Plain Subgeomorphic Province of the Los Angeles Coastal Plain at an elevation of approximately 130 to 140 feet (ft) above mean sea level (amsl). This plain is a slightly rolling topographic feature sloping gently to the northeast in the vicinity of the site due to the northwest trending Santa Fe Springs–Coyote Hills anticlinal system. The site is positioned above the southern limb of the Santa Fe Springs Anticline. Petroleum accumulation associated with this anticlinal structure has resulted in substantial oil production in the Santa Fe Springs area. Prominent topographic features in the area include the Puente and Coyote Hills to the northeast, east, and southeast (**Figure 1**). The San Gabriel River is located approximately 1.75 miles west of the

site and flows from north-northeast to south-southwest (**Figure 1**; Haley & Aldrich, 2005; Versar, 2000).

The Los Angeles Coastal Plain area is a large structural basin that has accumulated thousands of feet of sediments since Miocene time and has been tectonically active. The Los Angeles Coastal Plain generally consists of alluvial materials deposited by the Los Angeles, San Gabriel, and Santa Ana Rivers. The Santa Fe Springs Plain is comprised of the Upper Pleistocene-age Lakewood Formation (California Division of Mines and Geology, 1999). The Lakewood Formation and the underlying San Pedro Formation are folded over the anticlinal dome structure (Haley & Aldrich, 2005; Versar, 2000).

Several regional water-bearing units have been identified within the older alluvial fan and valley deposits of the Lakewood Formation and underlying San Pedro Formation. In the site area, the Lakewood Formation begins at ground surface, ranges from 100 to 180 ft thick, and is composed of three hydrostratigraphic units: 1) the Bellflower Aquiclude (upper unit), 2) the Exposition Aquifer, and 3) the Gage Aquifer. The Exposition and Gage aquifers consist predominantly of sands and fine gravels with discontinuous, thinly bedded silts and clays. These aquifers have an approximate combined thickness of 100 to 150 ft, approximately half of which is saturated (Versar, 2000).

Within the site vicinity, the Bellflower Aquiclude consists of a heterogeneous mixture of clays, silty clays, silts, and extensive interbedded lenses of sandy or gravelly silts and clays and has an estimated thickness between 20 and 40 ft. The major water-bearing unit of interest for this investigation is the Exposition Aquifer (otherwise known as the Artesia Aquifer), the upper water bearing unit of the Lakewood Formation. The Exposition Aquifer is composed of coarse gravel, coarse to fine sand, and interbedded silts and clays with a general southwesterly dip and thickness between 40 and 80 ft. The Exposition Aquifer is separated from the Gage Aquifer by an unnamed aquiclude. Based on boring logs from the installation of monitoring wells MW-14 A/B/B, MW-15 A/B/C, and MW-16 A/B/C, this aquiclude appears prominently between approximately 130 ft bgs to 170 ft bgs (elevation 0 to -40 ft-amsl).

Information for the site area in Santa Fe Springs indicates that the depth to first-encountered groundwater within the Exposition Aquifer ranges from 75 to 90 ft bgs. The Gage Aquifer consists predominantly of sands and fine gravels with an estimated thickness between 30 and 60 ft (Department of Water Resources [DWR], 1961; Versar, 2000; Haley & Aldrich, 2005; DHES, 2006).

2.2.2 Local Geology and Hydrogeology

In the site vicinity, the Santa Fe Springs Plain consists of the late Pleistocene alluvium of the Lakewood Formation. The Lakewood Formation unconformably overlies the lower Pleistocene San Pedro Formation and the Pliocene Pico Formation. The Lakewood Formation consists of interbedded clays, silts, silty sands, and sands representative of stream-type alluvial and floodplain deposits (Versar, 2000). Previous (Haley & Aldrich, 2005, Blasland, Bouck & Lee, Inc. [BBL], 2006; ARCADIS, 2009) subsurface investigations conducted at the site confirm that the lithology is a vertically and laterally heterogeneous mélange of such alluvial deposits. Underlying a surficial veneer of fill and roadbase materials at the site are interbedded alluvial sediments ranging in texture from poorly graded sands through fat clays. In general, the eastern portion of the site contains more coarser-grained sediments (sand and gravel) than the western portion of the site. During 1st quarter 2011 groundwater elevation measurements, there was an increase in groundwater elevation of approximately 2.16 feet, resulting in an approximate groundwater gradient of 0.007 foot per foot.

2.3 Groundwater Monitoring Program

The quarterly groundwater monitoring program currently includes the existing 44 wells and the newly installed 15 wells, as listed in **Table I** and shown on **Figure 2**. These wells include:

- Twenty-two onsite groundwater monitoring wells: MW-101, MW-103, MW-104A, MW-105, MW-201, MW-202, MW-204, MW-205, MW-504, MW-701, MW-702, MW-703, MW-704, MW-705, MW-706, W-9, W-10, W-11, W-12, W-17A, W-17B, and W-17C;
- Twenty-five downgradient offsite groundwater monitoring wells of which:
 - Four are located on the former Lakeland property: MW-501A, MW-502, MW-503B, and MW-707; and
 - Twenty-one are located on the Metropolitan State Hospital (MSH) property: MW-600A, MW-601A, MW-603, MW-604, MW-605, MW-606, MW-607, MW-708, MW-709, MW-710, MW-711, MW-712, MW-713, MW-714, MW-715, W-14A, W-14B, W-14C, W-15A, W-15B, and W-15C;
- Seven offsite groundwater monitoring wells located to the southeast on the Walker property including: EW-1, W-1, W-3A, W-4, W-16A, W-16B, and W-16C;

- Three offsite groundwater monitoring wells located to the east on the Bloomfield property that include: MW-106A, MW-107A, and MW-203; and
- Two onsite deep former water production wells identified as W-7 and W-8.

All monitoring wells are gauged in one day prior to purging. The well purging is performed using a vacuum stinger that is connected to a truck mounted vacuum with the exception of wells with FPPH. During purging, extracted groundwater volume and quality are monitored in the field for flow rate, temperature, pH, turbidity, electrical conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), color, and odor.

2.4 Local Groundwater Elevation Trend

Groundwater surface elevations were calculated for each well by subtracting the water level measurement from the top of casing elevation (**Table II**). Groundwater elevations were adjusted for wells containing FPPH, assumed to have a relative density of 0.80, which is typical for mean density of various petroleum hydrocarbon mixtures. Groundwater elevations, contour lines, flow direction and gradient are shown on **Figure 2**.

Based on groundwater level measurements obtained on January 28, 2011, first-encountered groundwater beneath the site vicinity ranges in elevation from 11.32 to 50.43 feet above mean sea level (ft-amsl), a slightly higher range than in the previous quarter. Groundwater elevations have exhibited both increases and decreases since previous measurements taken in October 2010, likely attributable to higher than average precipitation during the winter season. The increases, the first to occur for several years, were minor in shallow wells (less than 1.0 foot in wells W-10, W-11, W-15A, MW-104A, etc.) and were significant in deeper wells (7 to 10 feet in wells W-16B, W-16C, W-17B, and W-17C). These wells exhibiting the most significant increases were also the wells exhibiting the most significant decreases during the previous reporting period, indicating that there is likely influence from municipal pumping operations that most strongly affects wells that are more deeply screened, and that the influence originates from the northeast. Most likely, one or more pumping wells was recently deactivated as water demand decreased during the rainy season.

As a whole, the average change in groundwater elevation since the fourth quarter 2010 over all wells measured was an increase of 2.16 feet.

The average horizontal groundwater gradient is approximately 0.007 foot per foot (ft/ft), as shown in **Figure 2**, which is an increase since the previous monitoring period, and represents what is considered a moderately steep gradient. The groundwater flow direction originates from the northeast and turns south across the area of study. This flow direction is relatively consistent with those historically reported in previous investigations.

3. FPPH INVESTIGATION

The following section describes the previous FPPH investigation performed by Arcadis between 2005 and 2009 and the recent activities performed by Murex to complete the investigation.

3.1 Previous FPPH Investigations

FPPH was first detected in well MW-504, on June of 1988, with approximately 1.83 feet of thickness. Between that discovery and the year 2007, FPPH was measured in 18 other wells including: MW-101, MW-103, MW-104, MW-201, MW-202, MW-203, MW-204, MW-205, MW-206, MW-501, MW-502, MW-503, MW-504, MW-600, MW-600A, MW-601, MW-601A, W-3A, AND EW-1. These wells are colored red on **Figure 3**.

Hydrocarbon recovery was implemented over a period of several years: MW-504 was first being treated between 1988 and 1990; MW-501 and MW-502 received treatment between 1990 and 1991. Later, ARCADIS implemented passive hydrocarbon recovery between 2005 and 2009 on wells EW-1, MW-504, MW-600A, AND W-3A (ARCADIS, 2009).

In 2007, ARCADIS prepared a workplan to conduct a FPPH investigation and enhance FPPH plume delineation in response to a letter from the RWQCB dated April 3, 2007. The workplan was submitted to the RWQCB on August 31, 2007 and approved on February 11, 2008 (**Appendix A**). ROST was proposed as the method for measuring FPPH presence on-Site and on properties located downgradient of the Site.

The implementation of ARCADIS' workplan included the following:

- ARCADIS mobilized to the Site on February 21, 2008, and conducted 3 of the planned ROST locations [FPB-02, FPB-05, and FPB-07]. FPB-05 and -07 were completed, however, they struck refusal at a depth of 70 feet below ground surface (ft-bgs) while advancing FPB-02. The locations of the ROST borings are shown in **Figure 3**.
- Based on the results of the February 2008 work, as well as the results of ongoing soil borings and investigation activities on Site, ARCADIS requested a modification to the August 31, 2007 workplan in a letter dated July 8, 2009 (see **Appendix A**). FPPH borings FPB-03, FPB-04, and FPB-08 were relocated due to access issues. The proposed changes were approved by the RWQCB on July 9, 2009 by email.

- ARCADIS mobilized to the Site during the week of July 22, 2009 and advanced 9 more FPPH borings [FPB-01, -03/03A, -04/04R, -06, -08, -12, and 13]. The locations for FPPH borings FPB-09, -10, and -11 were not accessible at the time due to construction on the State Hospital property. The locations of the ROST borings are shown on **Figure 3**.

A report of findings was not submitted at that time, as it was ARCADIS' intention to complete the remaining ROST locations after construction on the Hospital property was complete.

3.2 Current FPPH Investigation

On July 21, 2010, the RWQCB issued an order letter to Lakeland to provide an update on the FPPH investigation and a schedule for its completion. Murex Environmental submitted to the RWQCB, on behalf of Lakeland, the *Free Phase Petroleum Hydrocarbon Investigation Status Report*, dated September 3, 2010. Included with the report was an Addendum to the FPPH Work Plan, previously approved on January 11, 2008. This FPPH Work Plan Addendum proposed to perform continuous coring during well replacement installations, to complete the ROST investigation and reposition FPB-09, and perform a FPPH bail down test on wells exhibiting product.. The FPPH Work Plan Addendum was approved on February 15, 2011 (**Appendix A**).

3.2.1 Visual Inspection of Soil Cores

Due to the significant drop in groundwater elevation over several years, as discussed above, Lakeland installed fifteen new monitoring wells to replace nineteen wells around the site vicinity that had gone dry. During drilling, deep vadose zone and aquifer soils were examined for the presence of FPPH. Core soil samples were examined for the visual presence of LNAPL, and screened using a PID at wells located within and in the proximity of the suspected free phase hydrocarbon area,. The PID readings and soil core observations are summarized in **Table III**.

3.2.2 Rapid Optical Screen Tool (ROST)

ROST technology is capable of providing real-time data collection while penetrating the soil. Cone penetration testing (CPT), which provides real-time stratigraphic data, was also performed simultaneously with each ROST test. Through a sapphire window on the side of the CPT probe, a laser is pulsed through fiber optic cables. When petroleum hydrocarbons are in the soil, the laser causes a florescence against the petroleum. Sensors in a second fiber optic cable record the degree of florescence (measured as a percentage). The intensity of the glow is proportional to the concentration of petroleum hydrocarbons, allowing ROST technology to delineate the affected area (Fugro Geosciences).

Three locations, Free Phase Boring (FPB)-09, FPB-10, and FPB-12, as well as two contingency locations, FPB-14 and FPB-15, were selected and marked. All of these points were located on the Norwalk Metropolitan State Hospital property. Prior to drilling, each survey location was identified for inspection by Underground Services Alert, and was later surveyed by a private utility location service.

For benchmark comparison purposes, FPPH samples taken from wells W-11, EW-1, MW-503B, and MW-708 were collected and delivered to the Fugro Geosciences office in Santa Fe Springs, California, to test their fluorescence response in pure form, and in a laboratory setting. The fluorescence response percentage ranged from approximately 48% to 206% as shown in **Table IV** and **Appendix B**. Also, **Table IV** presents photographs of the FPPH samples. These laboratory tests confirmed that:

- FPPH material taken from monitoring wells at the Site will fluoresce; and
- The resulting fluorescence from encountering the FPPH at the Site registers a significant and easily recognizable response from the equipment.

As a result, it can be concluded that if FPPH is encountered in the subsurface, the ROST would sense its presence.

During the implementation of the ROST activities, difficult drilling conditions were encountered, and as a result, all five of the marked and pre-cleared ROST survey locations were attempted. The locations of the historic ARCADIS ROST points and the recent Murex ROST points are shown on **Figure 3**. The following section discusses the results of the ROST investigation. A summary of the results is listed in **Table V**.

3.2.3 Bail-Down Test

FPPH measurements were conducted prior to the first quarter 2011 groundwater sampling (baseline measurement) using a Solinst Oil/Water Interface Meter. Wells that initially exhibit the presence of FPPH were purged until they become dry (i.e., “bailed-down”) or until approximately 10 well volumes were evacuated. Thereafter, the wells were inspected for the return of FPPH. The thickness of the FPPH was measured over longer and longer time intervals (1 hour, 2 hours, 4 hours, 24 hours, 2 days, 4 days, and 7 days).

For wells in which FPPH does not return within the first day, groundwater is sampled for analysis. For wells in which FPPH did return, the rate at which the material returned was

monitored and recorded (see **Table VI**). The intent of this test is to determine the theoretical yield of product recovery, if it were to be initiated in that well. By calculating the theoretical yield, conclusions can be drawn regarding the extent of FPPH impact in the surrounding formation.

4.0 RESULTS AND FINDINGS

4.1 Visual Inspection of Soil Cores

During the installation of monitoring wells located in the vicinity of historical FPPH measurements, continuous core sampling was performed between 80 and 130 ft bgs. This included wells MW-701, 702, 703, 704, 707, and 708.

Inspection and analysis of the cores yielded no visible free product or sheen. However, soil samples collected from well MW-704 at the 120 to 124 feet bgs were observed to have staining. Soil samples from wells MW-707 and MW-708 exhibited elevated PID concentrations, greater than instrument maximum detection of 2,000 ppm, starting in the capillary zone (about 20 feet above the water table and extending to about 10 feet below the water table (see **Table III**). In addition, strong hydrocarbon odors were also noted by the field personnel on the boring logs, which are included in **Appendix C**.

4.2 ROST Results

The ROST investigation was implemented in February 2008, July 2009, and March 2011 by attempting to advance ROST borings into the groundwater table in areas where monitoring wells have historically exhibited FPPH. The data collected is summarized in **Table V** and the ROST fluorescence response plots are provided in **Appendix D**. **Figure 3** shows the locations of the ROST borings.

Some of the ROST boring results indicated the presence of petroleum hydrocarbon compounds; however, not in the form of free product. The ROST identified only horizons of petroleum smearing within the unsaturated zone above the groundwater table (aka “capillary fringe”).

The following is a summary of the major findings:

- The ROST did not detect the presence of free product in any of the 16 attempted FPPH borings.
- The results indicate the presence of a smear zone at FPB-03 between 85 and 105 feet bgs. The smear zone most likely was created as a result of the drop in groundwater elevation measured over the last several years.

- ROST Boring FPB-04R indicated the presence of higher carbon chain (i.e. crude oil) at the depth interval of 10 to 50 feet bgs.
- When the ROST probe was able to reach groundwater table, lighter hydrocarbon compounds were consistently measured near the groundwater table (present as a smear zone and not as a free product); the fluorescence intensity was highest at ROST FPB-03;
- Heavier hydrocarbon compounds were consistently detected in shallower soils in the unsaturated zone;
- The CPT results at FPB-04R are consistent with the lithology identified during the soil investigation phases. The lithology for the offsite boring (FPB-08R, FPB-9A) is also similar to the onsite lithology in the south-western portion of the site.

ROST Borings FPB-02, FPB-03, FBP-09, FPB-12, FBP-15, and FPB-15A hit refusal at depths ranging from 56 feet to 85 feet. Where refusal occurred, the soil appears to cause more friction between 40 and 60 feet bgs. In general, detection of impacted soil in the unsaturated zone using ROST was consistent with the results achieved during the discrete soil sampling method used as a part of the Site investigation.

4.3 Bail-Down Test

Measureable free product was identified in four wells: W-11, EW-1, MW-503B, and MW-708. Free product was not detected in wells MW-704, MW-707, or MW-711, despite their position and proximity to wells historically exhibiting free product. In addition, after being purged, free product did not return to well W-11 for almost 2 weeks. The FPPH thickness measured in the four wells ranged from 0.13 to 0.69 feet. The bail-down measurements are listed in **Table VI**.

As shown in the photos accompanying the FPPH fluorescence test results in Table IV, the FPPH samples varied largely in appearance. The FPPH in well MW-708 is particularly pronounced, containing a murky grey, emulsified layer between the silty water and the FPPH layer on top (this could be the result of well development; well surging may have created an emulsion of silty water and petroleum). Well MW-503B contains a thick, oily brown FPPH layer that appears weathered. Well EW-1 contains thick, brown and emulsified petroleum product that is nearly black in color. By comparison, well W-11 contains a translucent, brightly colored yellow petroleum material.

The bail down testing for Well MW-503B resulted in an estimate for free product recovery rate on the order of a small fraction of a gallon per day (0.16 gal/day). The maximum thickness of free product in Well MW-503B was measured at 0.50 feet after three days and did not increase one week later. This behavior is displayed in graphical form in **Figure 4**.

4.4 Groundwater Elevation Trend & FPPH Migration

Based on the groundwater level measurements taken during the first quarter 2011, first-encountered groundwater beneath the Site vicinity ranges in elevation from about 12 to 50 feet above mean sea level (ft-amsl). Groundwater elevations have dropped by an average of approximately 4 feet since January 2009, compared to a decrease of approximately 3.6 feet between February 2008 and January 2009. Murex has reviewed the groundwater elevations measured since groundwater monitoring started in 1988, which indicates that the groundwater elevation has dropped on the order of 20 to 25 feet over that time period in many on- and off-Site wells. Regionally, groundwater elevations have decreased as a result of California's drought and possible municipal groundwater pumping operations.

Along with falling groundwater, FPPH drops as well. This effect causes FPPH to be redistributed in the subsurface at a rate based on relative permeability (*the ratio of effective permeability of the medium to a fluid at a specified saturation and the permeability of the medium to the fluid at 100% saturation*), capillary pressure, petroleum hydrocarbon chemical characteristics (e.g. solubility), physical characteristics (e.g. viscosity), wettability (*tendency of a fluid to spread on or adhere to a solid surface*), saturation, and residual saturation of the free product.

Our observations indicate that FPPH migrates further downward in the vadose zone (towards the new, lower water table) by displacing water from the pores of the soil matrix at a rate slower than the falling groundwater level. This migration route can take place when FPPH head is sufficient to displace water with increasing depths, since soil moisture saturation increases in the direction of the water table. Since the amount of FPPH is not increasing in the vadose zone (no new releases), the FPPH head may not increase sufficiently to allow further down-gradient migration or a downward migration rate similar to the water table drop rate. As a result, the FPPH stays, for the most part, above the water table with limited/slow lateral and vertical movement.

The end result of this phenomenon is the very slow introduction of FPPH into groundwater at rates not conducive to traditional recovery techniques. It is likely that the residual FPPH can be effectively addressed through bioventing, air sparging, and/or soil vapor extraction.

5.0 CONCLUSION

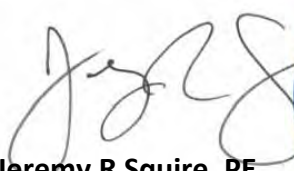
FPPH investigations were performed at the former CENCO facility in Santa Fe Springs, California using visual soil core inspection, ROST, and bail-down recovery testing. Results from the visual inspections and ROST investigations did not indicate the presence of free product despite a clear indication of FPPH during well gauging. Furthermore, the bail-down testing resulted in a very low recovery rate. As a result, Murex concludes that free phase petroleum hydrocarbon is present in the subsurface beneath and down-gradient of the former CENCO facility (see **Figure 3**), however, the majority of it is suspended in the unsaturated and capillary fringe zones. It is likely that the ability of the FPPH to leach into the groundwater will continue to dissipate over time as the material biodegrades. Strong evidence of biodegradation, such as high methane concentrations in soil gas, indicate that this effect is occurring.

6.0 CLOSING

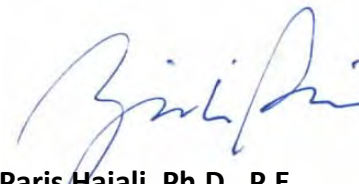
I certify under penalty of law that this document and all enclosures were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained herein is, to the best of my knowledge and belief, true, accurate and complete, however, is reliant upon public agency records, which could be incomplete or inaccurate beyond our control.

Should you have any questions or concerns regarding the material herein, please do not hesitate to contact the undersigned at (714) 508-0800.

Sincerely,
MUREX ENVIRONMENTAL, INC.


Jeremy R Squire, PE
Senior Engineer




Paris Hajali, Ph.D., P.E.
Principal

7.0 REFERENCES

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Table I
Well Construction Details
Former CENCO Refinery
Santa Fe Springs, CA

Well Installation					Completion Data															Location	Reference(s)	
Well ID	Date	By	Elevation ¹		Hole Diameter (in)	Casing Diameter (in)	Screen		Depth (ft)						Elevation ¹ (ft)							
			Ground Surface	Top of Casing			Slot	Length	Sand Pack		Slotted		Total Depth		Sand Pack		Slotted		Total Depth			
									(ft)	(ft amsl)	(in)	(ft)	Top	Bottom	Top	Bottom	Casing	Hole	Top			Bottom
Groundwater Monitoring Wells																						
EW-1	6/11/1905	Emcon	146.85	146.85	-	4	-	-	-	-	-	-	113.5	-	-	-	-	-	-	-	Walker	Versar (2000)
MW-101	8/28/1985	IT	145.19	138.00	12	4	-	20	69.5	90	70	90	90	95	66	45	65	45	45	40	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-103	8/30/1985	IT	137.18	139.36	12	4	-	20	-	-	79	99	99	99.5	-	-	58	38	-	37	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-104	8/24/1985	IT	-	-	12	4	-	20	-	-	76.5	96.5	97	99	-	-	66	46	-	43	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-104A	6/1999	Versar	142.38	144.13	-	4	-	-	-	-	65	100	100	-	-	-	-	-	-	-	Refinery	Versar (2000); measured well depth
MW-105	12/1995	TriHydro		141.16	-	4	-	-	-	-	68	98	98	100	-	-	-	-	-	39	Refinery	Versar (2000); measured well depth
MW-106	12/1995	TriHydro	-	-	-	4	-	-	-	-	74	104	106.45	106	-	-	-	-	42	42	Bloomfield	Versar (2000)
MW-106A	2/20/2006	N&M	152.92	152.81	8	4	0 02	27	82	110	83	110	110	110	70	42	69	42	42	42	Bloomfield	Well completion report
MW-107	12/1995	TriHydro	-	-	-	4	-	-	-	-	75	105	107.55	108	-	-	-	-	41	41	Bloomfield	Versar (2000)
MW-107A	2/20/2006	N&M	147.37	147.02	8	4	0 02	27	82	110	83	110	110	110	64	36	63	36	36	36	Bloomfield	Well completion report
MW-201	9/10/1985	IT	134.86	135.65	12	4	-	30	66	103	72	102	102	103	67	30	61	31	31	30	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-202	9/23/1985	IT	139.00*	140.62	16	4	-	30	58	105	63	93	93	105	70	23	65	35	35	23	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-203	9/13/1985	IT	144.08	143.71	12	4	-	30	64.7	107	77	107	107	119	78	36	66	36	36	24	Bloomfield	IT (1986); Versar (2000); ARCADIS (2003)
MW-204	9/19/1985	IT	141.15	142.90	12	4	-	30	67.5	105	73.3	103.3	103.3	105	73	35	67	37	37	35	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-205	9/14/1985	IT	140.00*	140.09	12	4	-	30	65.5	103	69.5	99.5	99.5	104 5	73	35	69	39	39	34	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-206 ²	9/18/1985	IT	-	-	-	4	-	30	62.5	104	71	101	101	104	67	26	59	29	29	26	Lakeland	IT (1986); Versar (2000); ARCADIS (2003)
MW-501	6/9/1986	IT	-	-	-	4	-	30	-	-	71	101	101	107	-	-	58	28	-	22	Lakeland	IT (1986); Versar (2000); ARCADIS (2003)
MW-501A	3/1999	ATC	131.26	130.89	-	4	-	-	-	-	75	95	95	95	-	-	-	-	-	35	Lakeland	Versar (2000); measured well depth
MW-502	6/11/1986	IT	131.88	131.00	-	4	-	30	-	-	74	104	104	104	-	-	54	24	-	24	Lakeland	IT (1986); Versar (2000); ARCADIS (2003)
MW-503	6/13/1986	IT	-	-	-	4	-	30	-	-	80.5	110.5	110.5	111	-	-	51	21	-	20	Lakeland	IT (1986); Versar (2000); ARCADIS (2003)
MW-503B	1/1999	Versar	133.03	132.66	-	4	-	-	-	-	69	109	109	109	-	-	-	-	-	21	Lakeland	Versar (2000); measured well depth
MW-504	6/18/1986	IT	-	137.18	-	4	-	50	-	-	58	118	95.76	118	-	-	77	17	-	17	Refinery	IT (1986); Versar (2000); ARCADIS (2003)
MW-600	8/15/1990	ENSR	-	-	-	4	-	30	-	-	78	108	108	110	-	-	42	12	-	10	MSH	IT (1986); Versar (2000); ARCADIS (2003)
MW-600A	6/1999	Versar	123.28	124.26	-	4	-	-	-	-	-	-	92.7	100	-	-	-	-	-	20	MSH	Versar (2000); measured well depth
MW-601	8/17/1990	ENSR	-	-	-	4	-	30	-	-	85	115	115	117	-	-	40	10	-	8	MSH	IT (1986); Versar (2000); ARCADIS (2003)
MW-601A	6/1999	Versar			-	4	-	-	-	-	65	100	100	100	-	-	-	-	-	27	MSH	Versar (2000); measured well depth
MW-603	12/1995	TriHydro	121.40	120.95	-	4	-	-	-	-	70	100	100	100	-	-	-	-	-	19	MSH	Versar (2000); measured well depth
MW-604	12/1995	TriHydro	140.52	140.07	-	4	-	-	-	-	73	103	103	103	-	-	-	-	-	35	MSH	Versar (2000); measured well depth
MW-605	12/1995	TriHydro	117.40	116.82	-	4	-	-	-	-	65	95	95	95	-	-	-	-	-	20	MSH	Versar (2000); measured well depth
MW-606	12/1995	TriHydro	116.90	116.06	-	4	-	-	-	-	70	100	100	100	-	-	-	-	-	14	MSH	Versar (2000); measured well depth
MW-607	12/1995	TriHydro	128.92	128.28	-	4	-	-	-	-	77	107	107	107	-	-	-	-	-	19	MSH	Versar (2000); measured well depth
W-1	12/1995	TRC	145.19	144.81	-	4	-	-	-	-	70	129	129	130	-	-	-	-	-	13	Walker	IT (1986); Versar (2000)
W-2 ²	12/1995	TRC	-	-	-	4	-	-	-	-	84	129	129	129	-	-	-	-	-	-	Walker	IT (1986); Versar (2000)
W-3 ²	12/1995	TRC	-	-	-	4	-	-	-	-	82	122	122	124	-	-	-	-	-	-	Walker	IT (1986); Versar (2000)
W-3A	-	-	137.18	136.79	-	4	-	-	-	-	-	-	111.52	115	-	-	-	-	-	21	Walker	Versar (2000)
W-4	12/1995	TRC	143.18	142.56	-	4	-	20	-	-	580	600	609	-	-	-	-	-	-	-	Walker	IT (1986); Versar (2000)
W-9	8/22/2006	TA	140.37	139.84	8	2	0 01	35	73	111	75	110	110	120 5	66	28	64	29	29	19	Refinery	ARCADIS BBL (2006)
W-10	8/21/2006	TA	141.39	140.71	8	2	0 01	35	73	111	75	110	110	130	67	29	65	30	30	10	Refinery	ARCADIS BBL (2006)
W-11	8/25/2006	TA	141.96	142.10	8	2	0 01	35	73	111	75	110	110	119	68	30	66	31	31	22	Refinery	ARCADIS BBL (2006)
W-12	8/23/2006	TA	142.93	145.15	8	2	0 01	35	75	114	75	114	114	120 5	69	30	69	30	30	24	Refinery	ARCADIS BBL (2006)

Table I
Well Construction Details
Former CENCO Refinery
Santa Fe Springs, CA

Well Installation					Completion Data															Location	Reference(s)	
Well ID	Date	By	Elevation ¹		Hole Diameter (in)	Casing Diameter (in)	Screen		Depth (ft)						Elevation ¹ (ft)							
			Ground Surface	Top of Casing			Slot	Length	Sand Pack		Slotted		Total Depth		Sand Pack		Slotted		Total Depth			
									(ft)	(ft amsl)	(in)	(ft)	Top	Bottom	Top	Bottom	Casing	Hole	Top			Bottom
W-14A	1/22/2008-1/30/2008	Arcadis	115.23	114.71	9	2	0 02	45	67	112	67	112	112	200	48	3	48	3	3	-85	MSH	ARCADIS (2008)
W-14B			115.00*	114.78	9	2	0 02	10	157	167	157	167	167	200	-42	-52	-42	-52	-52	-85		
W-14C			115.00*	114.78	9	2	0 02	10	185	195	185	195	195	200	-70	-80	-70	-80	-80	-85		
W-15A	11/27/2007-12/10/2007	Arcadis	127.91	127.59	10	2	0 02	45	78	126	80	125	125	200	50	2	48	3	3	-72	MSH	ARCADIS (2008)
W-15B			128.00*	127.61	10	2	0 02	10	143	156	145	155	155	200	-15	-28	-17	-27	-27	-72		
W-15C			128.00*	127.59	10	2	0 02	10	188	200	190	200	200	200	-60	-72	-62	-72	-72	-72		
W-16A	10/24/2007-10/30/2007	Arcadis	147.89	147.60	10	2	0 02	45	76	125	78	123	123	200	72	23	70	25	25	-52	Walker	ARCADIS (2008)
W-16B			148.00*	147.68	10	2	0 02	10	143	156	152	162	162	200	5	-8	-4	-14	-14	-52		
W-16C			148.00*	147.67	10	2	0 02	10	184	200	186	196	196	200	-36	-52	-38	-48	-48	-52		
W-17A	1/31/2008-2/8/2008	Arcadis	141.60	141.38	9	2	0 02	45	63	108	63	108	108	200	78	33	78	33	33	-59	Refinery	ARCADIS (2008)
W-17B			142.00*	141.37	9	2	0 02	10	159	169	159	169	169	200	-18	-28	-18	-28	-28	-59		
W-17C			142.00*	141.38	9	2	0 02	10	190	200	190	200	200	200	-49	-59	-49	-59	-59	-59		
MW-701	12/6/2010	Murex	136.87	139.48	12	4	0 02	50	77	130	80	130	130	130	59.87	6 87	56.87	6.87	6.87	6.87	Refinery	Murex (2011)
MW-702	12/15/2010	Murex	140.90	140.12	12	4	0 02	50	77	130	80	130	130	130	63.90	10.90	60.90	10.90	10.90	10.90	Refinery	Murex (2011)
MW-703	12/10/2010	Murex	134.73	137.23	12	4	0 02	50	77	130	80	130	130	130	57.73	4.73	54.73	4.73	4.73	4.73	Refinery	Murex (2011)
MW-704	12/14/2010	Murex	137.93	137.66	12	4	0 02	50	77	130	80	130	130	130	60.93	7 93	57.93	7.93	7.93	7.93	Refinery	Murex (2011)
MW-705	12/13/2010	Murex	139.16	141.94	12	4	0 02	50	77	130	80	130	130	130	62.16	9.16	59.16	9.16	9.16	9.16	Refinery	Murex (2011)
MW-706	12/9/2010	Murex	139.68	139.30	12	4	0 02	50	77	130	80	130	130	130	62.68	9.68	59.68	9.68	9.68	9.68	Refinery	Murex (2011)
MW-707	12/23/2010	Murex	128.86	128.43	12	4	0 02	50	77	130	80	130	130	130	51.86	-1.14	48.86	-1.14	-1.14	-1.14	Getty Drive	Murex (2011)
MW-708	1/12/2011	Murex	126.73	126.26	12	4	0 02	50	77	130	80	130	130	130	49.73	-3 27	46.73	-3.27	-3.27	-3.27	MSH	Murex (2011)
MW-709	1/26/2011	Murex	140.48	139.78	12	4	0 02	50	77	130	80	130	130	130	63.48	10.48	60.48	10.48	10.48	10.48	MSH	Murex (2011)
MW-710	1/13/2011	Murex	122.15	121.99	12	4	0 02	50	77	130	80	130	130	130	45.15	-7 85	42.15	-7.85	-7.85	-7.85	MSH	Murex (2011)
MW-711	1/17/2011	Murex	128.09	127.84	12	4	0 02	50	77	130	80	130	130	130	51.09	-1 91	48.09	-1.91	-1.91	-1.91	MSH	Murex (2011)
MW-712	1/24/2011	Murex	123.57	123.31	12	4	0 02	50	77	130	80	130	130	130	46.57	-6.43	43.57	-6.43	-6.43	-6.43	MSH	Murex (2011)
MW-713	1/19/2011	Murex	128.42	128.15	12	4	0 02	50	77	130	80	130	130	130	51.42	-1 58	48.42	-1.58	-1.58	-1.58	MSH	Murex (2011)
MW-714	1/20/2011	Murex	129.07	128.87	12	4	0 02	50	77	130	80	130	130	130	52.07	-0 93	49.07	-0.93	-0.93	-0.93	MSH	Murex (2011)
MW-715	1/27/2011	Murex	116.66	116.22	12	4	0 02	50	77	130	80	130	130	130	39.66	-13 34	36.66	-13.34	-13.34	-13.34	MSH	Murex (2011)
Groundwater Production Wells																						
					-	-	-	80	-	-	450	530	690	-	-	-	-	-	-	-	Refinery	IT (1986)
W-7	-		-	141.97	-	-	-	90	-	-	600	690	-	-	-	-	-	-	-	-	Refinery	
W-8	-		-	141.11	-	-	-	-	-	-	-	-	994	-	-	-	-	-	-	-	Refinery	

NOTES:
Sources: IT, 1986; Versar, 2000; Arcadis, 2003, 2006, 2008, and 2009; Dan Herlihy Environmental Services, 2006 (as shown).

¹Survey by BLC Surveying and BBL, Inc. Benchmark No. 13-15290 City of Los Angeles

- ²Well abandoned
- ft Feet
 - in Inches
 - MSH Metropolitan State Hospital Property
 - amsl Above mean sea level
 - TA Test America Drilling
 - TOC Top of casing
 - * Value retrieved from Google Earth

Table II
Summary of Groundwater Level Measurements - Q1 2011
Former CENCO Refinery
Santa Fe Springs, CA

Well ID	Date	Total Depth (ft)	Depth to Groundwater (ft)	Depth To FPPH (ft)	FPPH Thickness (ft)	Top of Casing Elevation (ft amsl)	Groundwater Elevation (ft amsl)
EW-1	1/28/2011	113.00	105.98	105.54	0.44	144.78	39.15
W-1	1/28/2011	129.61	111.71		0.00	144.81	33.10
W-3A	1/28/2011	111.73	DRY		0.00	136.79	NA
W-4	1/28/2011	129.71	114.24		0.00	142.56	28.32
W-7	1/28/2011	NM	96.11		0.00	141.97	NA
W-8	1/28/2011	NM	79.00		0.00	141.11	NA
W-9	1/28/2011	110.37	94.47		0.00	139.84	45.37
W-10	1/28/2011	110.21	104.41		0.00	140.71	36.30
W-11	2/2/2011	112.61	108.66	108.08	0.58	142.10	33.90
W-12	1/28/2011	116.10	109.55		0.00	145.15	35.60
W-14 A	1/28/2011	111.85	99.27		0.00	114.71	15.44
W-14 B	1/28/2011	112.09	96.94		0.00	114.78	17.84
W-14 C	1/28/2011	166.57	97.15		0.00	114.78	17.63
W-15 A	1/28/2011	125.70	116.27		0.00	127.59	11.32
W-15 B	1/28/2011	155.60	116.11		0.00	127.61	11.50
W-15 C	1/28/2011	197.34	115.71		0.00	127.59	11.88
W-16 A	1/28/2011	123.12	114.43		0.00	147.60	33.17
W-16 B	1/28/2011	160.25	118.59		0.00	147.68	29.09
W-16 C	1/28/2011	196.30	118.73		0.00	147.67	28.94
W-17 A	1/28/2011	108.30	103.26		0.00	141.38	38.12
W-17 B	1/28/2011	169.60	106.96		0.00	141.37	34.41
W-17 C	1/28/2011	200.00	106.97		0.00	141.38	34.41
MW-101	1/28/2011	90.72	DRY		0.00	138.00	NA
MW-103	1/28/2011	94.70	DRY		0.00	139.36	NA
MW-104A	1/28/2011	100.08	93.70		0.00	144.13	50.43
MW-105	1/28/2011	100.47	DRY		0.00	141.16	NA
MW-106A	1/28/2011	110.00	107.15		0.00	152.81	45.66
MW-107A	1/28/2011	109.49	104.32		0.00	147.02	42.70
MW-201	1/28/2011	101.60	DRY		0.00	135.65	NA
MW-202	1/28/2011	92.55	DRY		0.00	140.62	NA
MW-203	1/28/2011	102.30	DRY		0.00	143.71	NA
MW-204	1/28/2011	103.10	DRY		0.00	142.90	NA
MW-205	1/28/2011	98.27	DRY		0.00	140.09	NA
MW-501A	1/28/2011	93.27	DRY		0.00	130.89	NA
MW-502	1/28/2011	100.59	DRY		0.00	131.00	NA
MW-503B	2/4/2011	108.67	107.63	107.00	0.63	132.66	25.53
MW-504	1/28/2011	95.76	DRY		0.00	137.18	NA
MW-600A	1/28/2011	92.70	DRY		0.00	124.26	NA
MW-601A	1/28/2011	89.90	NM		0.00	126.53	NA
MW-603	1/28/2011	97.60	DRY		0.00	120.95	NA
MW-604	1/28/2011	103.20	DRY		0.00	140.07	NA
MW-605	1/28/2011	93.98	DRY		0.00	116.82	NA
MW-606	1/28/2011	99.05	DRY		0.00	116.06	NA
MW-607	1/28/2011	107.05	DRY		0.00	128.28	NA
MW-701	1/27/2011	130.00	106.01		0.00	139.48	33.47
MW-702	1/27/2011	130.00	105.95		0.00	140.12	34.17
MW-703	1/27/2011	130.00	107.44		0.00	137.23	29.79
MW-704	2/9/2011	130.00	109.07		0.00	137.66	28.59
MW-705	1/25/2011	130.00	109.82		0.00	141.94	32.12
MW-706	1/24/2011	130.00	106.22		0.00	139.30	33.08

Table II
Summary of Groundwater Level Measurements - Q1 2011
Former CENCO Refinery
Santa Fe Springs, CA

Well ID	Date	Total Depth	Depth to Groundwater	Depth To FPPH	FPPH Thickness	Top of Casing Elevation	Groundwater Elevation
MW-707	1/28/2011	130.00	103.75		0.00	128.43	24.68
MW-708	2/2/2011	130.00	102.85	102.72	0.13	126.26	23.51
MW-709	2/1/2011	130.00	112.56		0.00	139.78	27.22
MW-710	2/8/2011	130.00	100.65		0.00	121.99	21.34
MW-711	2/8/2011	130.00	107.79		0.00	127.84	20.05
MW-712	2/9/2011	130.00	105.00		0.00	123.31	18.31
MW-713	2/9/2011	130.00	110.49		0.00	128.15	17.66
MW-714	2/14/2011	142.00	110.25		0.00	128.87	18.62
MW-715	2/14/2011	134.00	102.55		0.00	116.22	13.67

NOTES:

ft Feet
FPPH Free-phase petroleum hydrocarbon
amsl Above mean sea level
NM Not measured, inaccessible
NA Not available/applicable

Table III
Summary of Soil FPPH Investigation Results
Former CENCO Refinery
Santa Fe Springs, CA

Well ID	Observed Product	Observed Staining	Approximate Depth to Water (ft)	PID Above Water	PID @ Water	PID Below Water	Field Observations
MW-703	No	No	105	0 @100	15 @105	74 @120	No Odor above water - 90 to 100
MW-704	No	Yes	109	376 @105	298 @110	702 @115	Hydrocarbon Odor; staining at 67, 77, 120 to 124
MW-707	No	No	110	>2000 @85	84.6 @110	345 @115	Hydrocarbon odor
MW-708	No	No	105	>2000 @100	>2000 @105	>2000 @110	Strong Hydrocarbon odor

Notes

ft - Feet

PID - Reading from Photoionization Detector

Table IV
ROST Fluorescence Reponse Data
Former CENCO Refinery
Santa Fe Springs, CA





Well ID	Fluorescence (%RE)	Sample of Free Product Material
MW-503B	162%	
MW-708 (1)	183%	
MW-708 (2)	206%	
MW-708 (3)	18%	
EW-1	77%	
W-11	48%	

Table V
Summary of ROST Investigation Results
Former CENCO Refinery
Santa Fe Springs, CA

ROST Location ID	Date	Completed Depth (ft-bgs)	Approximate GW Depth (ft-bgs)	Max Fluorescence Intensity (%)	Depth of Max Fluorescence (ft-bgs)	Fluorescence Intensity Near Groundwater Table ²	Interpretation
FPB-01	7/22/2009	103.88	102	11.97	7.69	5	Not indicative of FPPH
FPB-02	2/21/2008	70.1	102	11.65	45.2	NA	Hit refusal
FPB-03	7/22/2009	85.03	100	2.46	5.06	20	Not indicative of FPPH, Indicative of a smear zone, hit refusal at 85 feet
FPB-03A	7/22/2009	105.04	100	30.04	95.5	20	Not indicative of FPPH, Indicative of a smear zone
FPB-04	7/23/2009	104.64	100	34.99	30.46	5	Not indicative of FPPH, near groundwater but indicative of highly saturated soil with heavy fuel
FPB-04R	7/24/2009	109.26	100	42.73	35.78	1	Not indicative of FPPH, near groundwater but indicative of highly saturated soil with heavy fuel. CPT was also performed at this location
FPB-05	2/21/2008	100.71	98	67.83	48.55	10	Not indicative of FPPH near groundwater, at 50 ft may be indicative of highly saturated soil with light fuel
FPB-06	7/23/2009	103.02	99	7.79	93.19	5	Not indicative of FPPH
FPB-07	2/21/2008	100.01	99	4.55	5.53	<1	Not indicative of FPPH
FPB-08	7/23/2009	100.05	100	1.31	7.13	<1	Not indicative of FPPH. CPT was also performed at this location.
FPB-09	3/29/2011	56.12		0.92	0.67	NA	Hit refusal at 56.12 feet bgs; Not indicative of FPPH
FPB-09B	3/29/2011	94.43		1.63	9.67	<1	Not indicative of FPPH
FPB-12	7/22/2009	91.04	110	6.72	53.43	1	Not indicative of FPPH
FPB-13	7/24/2009	102.23	102	42.21	52.97	<1	Not indicative of FPPH
FPB-10	3/29/2011	N/A					CPT hit refusal at 64.12 ft bgs as a result ROST was not performed
FPB-11	3/29/2011	66.42		1.84	1.42	NA	Hit refusal at 66.42 feet bgs; Not indicative of FPPH
FPB-11A	3/29/2011	85.36		1.55	1.16	NA	Hit refusal at 79.45 feet bgs; Not indicative of FPPH
FPB-14	3/29/2011	79.45		1.52	26.48	NA	Hit refusal at 80 feet bgs; Not indicative of FPPH

Notes

ft-bgs - Feet below ground surface

¹ GW Depth at time of ROST implementation

² Fluorescence intensity indicative of FPPH is on the order of 100% or more for lighter product

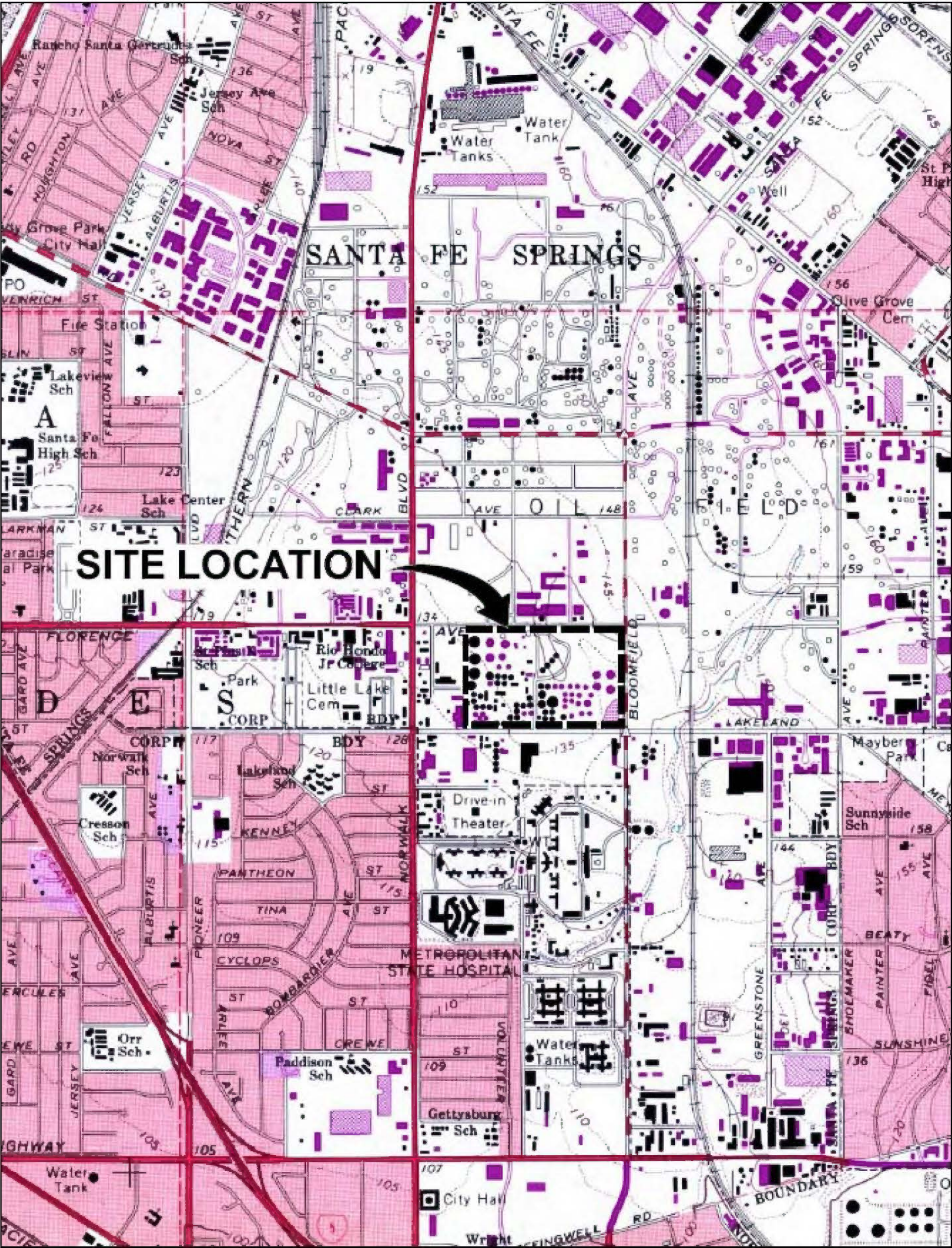
NA - Not Applicable

Table VI
Summary of FPPH Measurements (Bail-Down Test)
Former CENCO Refinery
Santa Fe Springs, CA

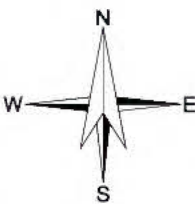
Date	DTFPPH	DTW	FP Thickness	Comments
EW-1				
1/28/2011	105.54	105.98	0.44	
2/3/2011	105.65	106.04	0.39	Before purge
2/3/2011	--	105.64	0	1 hr after
2/3/2011	--	105.65	0	2 hrs
2/3/2011	--	105.66	0	4 hrs
2/4/2011	--	105.59	0	24 hrs
2/7/2011	105.68	105.70	0.02	72+ hrs
2/14/2011	105.81	105.84	0.03	10 days+
3/22/2011	105.79	106.25	0.46	
3/29/2011	105.76	106.31	0.55	
4/11/2011	105.77	106.4	0.63	
4/13/2011	105.91	106.6	0.69	
4/13/2011	-	106.04	NA	
4/18/2011	106.04	106.19	0.15	
4/19/2011	105.96	106.12	0.16	
4/21/2011	105.96	106.25	0.29	
W-11				
1/28/2011	108.08	108.66	0.58	
3/22/2011	-	107.75	NA	
3/29/2011	-	107.53	NA	
4/15/2011	-	107.33	NA	
4/15/2011	-	107.3	NA	
4/19/2011	-	107.23	NA	
4/21/2011	-	107.22	NA	
MW-503B				
2/3/2011	107.00	107.63	0.63	Before purge
2/3/2011	108.02	108.12	0.10	1 hr after
2/3/2011	107.87	108.00	0.13	2 hrs
2/3/2011	107.69	107.86	0.17	4 hrs
2/4/2011	106.78	107.10	0.32	24 hrs
2/7/2011	106.91	107.41	0.50	72+ hrs
2/14/2011	106.99	107.45	0.46	10 days+
3/22/2011	-	106.5	NA	
3/29/2011	-	106.36	NA	
4/11/2011	-	106.15	NA	
4/14/2011	-	106.07	NA	
4/15/2011	-	106.09	NA	
4/19/2011	-	106.04	NA	
4/21/2011	-	106.02	NA	

Table VI
Summary of FPPH Measurements (Bail-Down Test)
Former CENCO Refinery
Santa Fe Springs, CA

Date	DTFPPH	DTW	FP Thickness	Comments
MW-708				
2/3/2011	102.72	102.85	0.13	Post development
3/22/2011	-	102.05	NA	
3/29/2011	101.91	102.29	0.38	
4/11/2011	101.71	101.92	0.21	
4/19/2011	101.65	101.85	0.20	
4/21/2011	101.63	101.92	0.29	



SOURCE OF BASE MAP
U.S. GEOLOGICAL SURVEY, 7.5 MIN QUAD., WHITTIER, CA. 1965, PHOTOREVISED 1981



SCALE: NOT TO SCALE

FORMER CENCO REFINERY
12345 LAKELAND ROAD
SANTA FE SPRINGS, CALIFORNIA

SITE LOCATION MAP



FIGURE
1

DRAWN BY: RLM REVISION DATE: 3/8/11

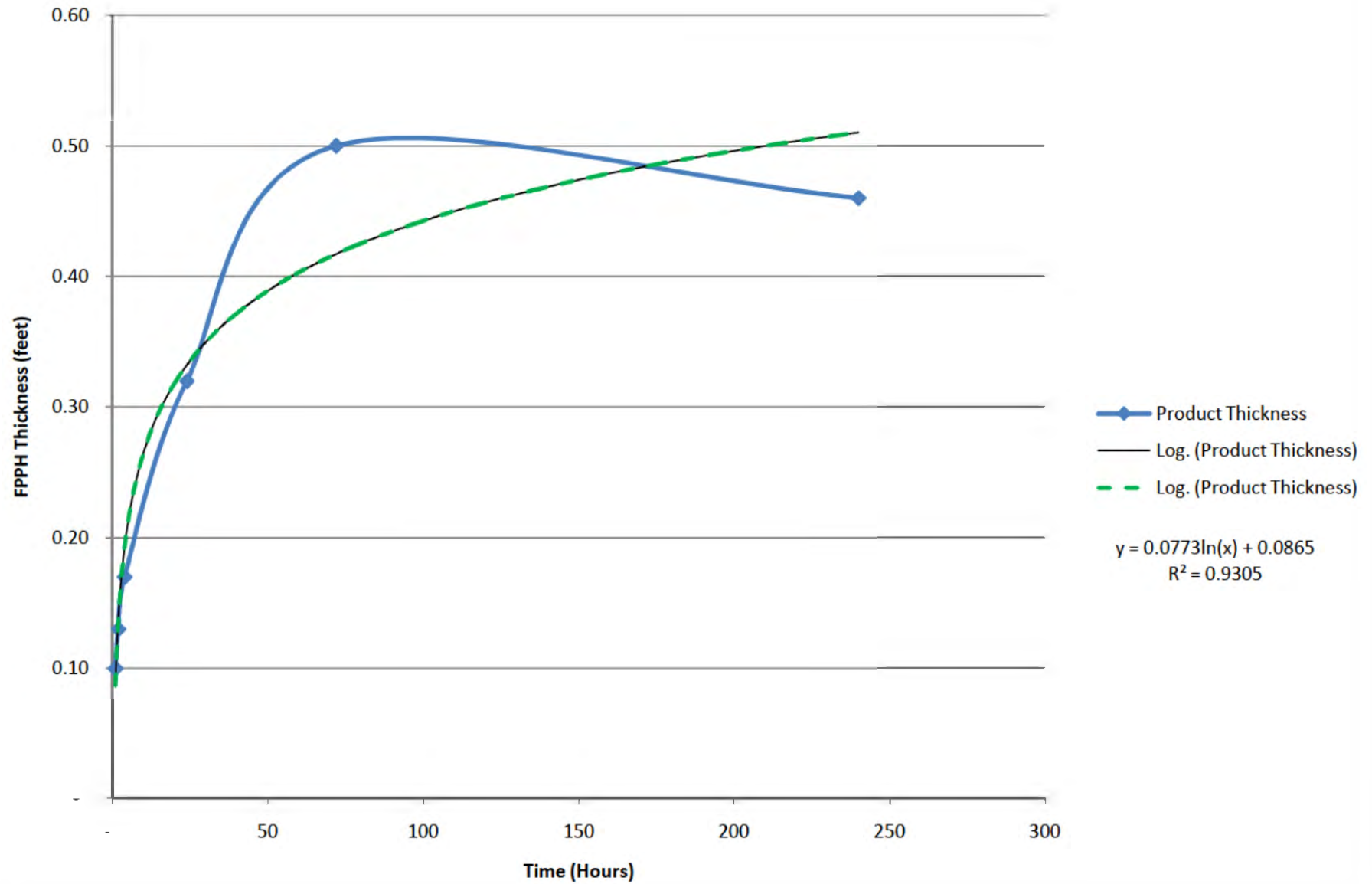
FX-9 Wells

FX Wells

FX-9 Wells

FX Wells

FIGURE 4
MW-503B Bail-Down Test Results



Appendix A



California Regional Water Quality Control Board Los Angeles Region



Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: <http://www.waterboards.ca.gov/losangeles>

Arnold Schwarzenegger
Governor

January 11, 2008

Mr. Michael Barranco
CENCO Refinery Company
12345 Lakeland Road
Santa Fe Springs, California 90670

CONDITIONAL APPROVAL OF WORKPLANS FOR SOIL GAS SURVEY, FREE PHASE PETROLEUM HYDROCARBON INVESTIGATION, SUPPLEMENTAL SOIL INVESTIGATION, AND BASELINE RISK ASSESSMENT – CENCO REFINERY – 12345 LAKELAND ROAD, SANTA FE SPRINGS, CALIFORNIA (SITE CLEANUP PROGRAM CASE NO. 0318, SITE ID NO. 2040071, CAO 97-118)

Dear Mr. Barranco:

The Los Angeles Regional Water Quality Board (Regional Board) staff have received and reviewed the following documents submitted by ARCADIS BBL regarding the former CENCO Refinery located at 12345 Lakeland Road, Santa Fe Springs, California (Site):

- *Supplemental Soil Investigation Work Plan*, dated August 31, 2007,
- *Free Phase Petroleum Hydrocarbon Investigation Work Plan*, dated August 31, 2007,
- *Baseline Risk Assessment Work Plan*, dated September 4, 2007, and
- *Revised Off-Site Soil Gas Survey Work Plan*, dated August 14, 2007.

These workplans were submitted to the Regional Board and the Department of Toxic Substances Control (DTSC) as required in the Regional Board letter, dated April 3, 2007 in compliance with Cleanup and Abatement Order (CAO) No. 97-118. Because a hospital and an elementary school are present within 1,000 feet of the Site, the DTSC is coordinating with Regional Board staff to review site documents and thereby ensure that risks to human health are addressed by your investigations. The workplans adequately address and satisfy Regional Board and DTSC requirements. You are directed to implement the workplan with conditions noted below.

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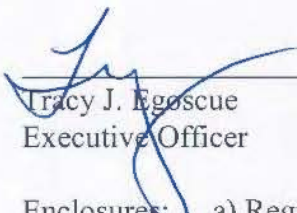
REQUIREMENTS:

Based on the Regional Board's and DTSC's review of the workplans, you are required to perform the following:

1. Provide an additional workplan to delineate the volatile organic compound (VOC) contamination in the soil gas, offsite to the south beneath Lakeland Road and beyond as necessary. Propose sample locations to assess VOC concentrations in the soil gas in the Metropolitan State Hospital facility. Include a health and safety plan, and soil gas investigation quality assurance (QA)/ quality control (QC) protocol. Submit this workplan to the Regional Board and DTSC by **March 14, 2008**.
2. Submit a workplan to perform a human health risk assessment (HHRA) for the Metropolitan State Hospital in accordance with AB422 (see attached). You will utilize the results of the aforementioned soil gas investigation, the free phase petroleum hydrocarbon investigation, and quarterly groundwater monitoring results. The HHRA must be submitted to the Regional Board and Mr. Steve Hariri DTSC's Project Manager who will in turn forward it to their toxicologist for review within 30 days of submitting the soil gas and free phase petroleum reports.
3. Submit the findings and results of the assessments approved in this letter by **June 6, 2008** to this Regional Board.
4. For each submittal, you are required to submit a hard copy and a PDF version to Mr. Steven Hariri (shariri@dtsc.ca.gov) of the DTSC's Cypress Branch. Each submittal must also be uploaded to the State Water Resources Control Board's GEOTRACKER database.

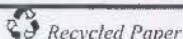
If you have any questions, please contact Mr. Don Indermill at (213) 576-6811 or Mr. Dixon Oriola of my staff at (213) 576-6803.

Sincerely,


Tracy J. Egoscue
Executive Officer

Enclosures: a) Regional Board Letter dated April 3, 2007
b) Chaptered AB 422 California Legislative Bill

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Mr. Michael Barranco
CENCO Refinery

- 3 -

January 11, 2008

cc: Mr. Steven Hariri, Department of Toxic Substances Control (DTSC), Cypress Branch
Mr. Tom Hall, Santa Fe Springs Fire Department
Mr. David Isola, Isola & Bowers
Mr. Paris Hajali, ARCADIS BBL
Mr. Leah Levy, ARCADIS BBL

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California Regional Water Quality Control Board Los Angeles Region



Recipient of the 2001 Environmental Leadership Award from Keep California Beautiful

Linda S. Adams
Agency Secretary

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Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address <http://www.waterboards.ca.gov/losangeles>

Arnold Schwarzenegger
Governor

February 2, 2007

Mr. Michael Barranco
CENCO Refinery Company
12345 Lakeland Road
Santa Fe Springs, California 90670

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7005 1820 0001 2683 6238

REQUIREMENT FOR WORKPLAN PURSUANT TO CALIFORNIA WATER CODE (CWC) SECTION 13267 – CENCO REFINERY – 12345 LAKELAND ROAD, SANTA FE SPRINGS, CALIFORNIA (SLIC CASE NO. 0318, SLIC ID NO. 2040071, CAO 97-118)

Dear Mr. Barranco:

The California Regional Water Quality Control Board (Regional Board), Los Angeles Region, is the public agency with primary responsibility for the protection of groundwater and surface water quality for all beneficial uses within the coastal watersheds of Los Angeles and Ventura Counties, which includes the CENCO Refinery (Site).

Your consultant, BBL, submitted the *Additional Site Investigation Report* dated August 2006 that includes a description of soil, soil gas, and groundwater investigative activities conducted across the site. Regional Board staff will provide comments on the full report in a separate letter. This letter addresses our concern with concentrations of volatile organic compounds (VOCs) in the soil vapor and soil matrix along the western margin of the site that are undelineated to the west. In addition, Rio Hondo Junior College is 700 feet to the west of the Site and requires a shallow soil gas assessment to ascertain whether a human health inhalation threat exists. Examples of the reported VOC concentrations that require vertical and lateral delineation along the western site boundary are as follows:

Table 1: Soil Vapor Sample Results:

Vapor Probe	Date	Depth (feet bgs ¹)	Benzene (µg/l) ²	Xylenes (µg/l) ²	Toluene (µg/l) ²
V153	12/7/2005	5	5.0	65	67
	12/7/2005	10	2.8	9.9	14
V199	12/14/2005	5	36	138	110
	12/14/2005	10	52	206	160
V215	12/15/2005	5	6.5	128	3.6
	12/15/2005	10	2.5	42	2.0
California Human Health Screening Levels for residential shallow soil vapor			0.362	315	135

1. bgs: below ground surface
2. µg/L: micrograms per liter

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Table 2: Soil Sample Results:

Soil Boring	Date	Depth (feet bgs ¹)	Napthalene (µg/kg) ²	Xylenes (µg/kg) ²
B183	1/25/2006	2	<200	<5.0
	1/25/2006	5	24	<5.0
	1/25/2006	10	22,953	<200
B130	1/19/2006	2	7,800	69,200
	1/19/2006	5	6,300	28,000
	2/19/2000	10	<5.0	3.6

3. bgs: below ground surface 2. µg/kg: milligrams per kilogram

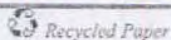
Due to the proximity of the Rio Hondo College to these VOC concentrations, you are required to assess the extent of VOCs in the subsurface along or adjacent to Norwalk Boulevard. Pursuant to Division 7, Chapter 4, Article 4, Section 13267 of the California Water Code (CWC), the Regional Board is requiring you to submit a work plan for a subsurface investigation that meets the requirements as outlined below. Regional Board staff can meet with you, if necessary, to discuss an appropriate modifications to scope of work, if necessary.

REQUIREMENTS:

1. Regional Board staff requires a shallow soil gas investigation in order to determine whether VOC contamination is present in the subsurface soil beneath the College and whether releases from CENCO Refinery pose a threat to human health and the groundwater quality. In addition, The Department of Toxic Substances Control (DTSC) will coordinate with Regional Board staff the review of proposed work to assure risks to human health are addressed by your investigation. You are therefore directed to submit 3 copies of all technical reports to both agencies, as required, until the investigation is complete.
2. The soil vapor investigation must be developed in accordance with the *Advisory for Active Soil Gas Investigations, January 28, 2003, Interim Guidance for Active Soil Gas Investigation, February 25, 1997, DTSC and LARWQCB, and the County of Los Angeles Department of Public Works Guidelines for Report Submittals, 1993, Section VII, Site Assessment Report Guidelines*. Please reference the attached documents.
3. Once your work plan has been approved and the field work implemented, a technical report summarizing the findings shall be submitted to this Regional Board by a due-date to be specified in our approval letter to you. Please do not commence investigative work until this office has approved your work plan.
4. Effective July 1, 2005, all reports submitted to the Regional Board must comply with the electronic submittal of information (ESI) to be submitted over the internet, including, groundwater monitoring reports, soil and/or groundwater investigation/characterization reports, remedial action plans, requests for closure, and portable data format (PDF). The text of the regulations can be found at the URL:

http://www.waterboards.ca.gov/ust/cleanup/electronic_reporting/docs/final_electronic_regs_dec04.pdf

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Mr. Michael Barranco
CENCO Refinery

- 3 -

February 2, 2007

5. The California Business and Professions Code Sections 6735, 7835, and 7835.1 require that engineering and geologic evaluations and judgments be performed by or under the direction of registered professionals. Therefore, all future work must be performed by or under the direction of a registered geologist or registered civil engineer. A statement is required in the report that the registered professional in responsible charge actually supervised or personally conducted all the work associated with the project.

Pursuant to Section 13267(b) of the California Water Code, you are hereby directed to submit the workplan to this Regional Board by **March 30, 2007**. Failure to submit the required workplan by the due date specified may result in the imposition of civil liability penalties by this Regional Board of up to \$1,000.00 per day for each day the report is not received pursuant to Section 13268 of the California Water Code.

If you have any questions, please contact Mr. Don Indermill at (213) 576-6811 or Mr. Dixon A. Oriola of my staff at (213) 576-6803.

Sincerely,


Jonathan S. Bishop
Executive Officer

Attachments: a) *Advisory for Active Soil Gas Investigation, January 28, 2003*
b) *Guidelines for Report Submittals, June 1993*
c) *Interim Guidance for Active Soil Gas Investigation, February 25, 1997*

cc: Dr. Rebecca Chou, School Property Evaluation and Cleanup Division, DTSC, Cypress Branch

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California Regional Water Quality Control Board

Los Angeles Region



Linda S. Adams
Cal/EPA Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: <http://www.waterboards.ca.gov/losangeles>

Arnold Schwarzenegger
Governor

July 21, 2010

Mr. Mike Barranco
Lakeland Development Company
12345 Lakeland Road
Santa Fe Springs, California 90670

**REQUIREMENTS FOR SUBSURFACE INVESTIGATION AND CLEANUP PURSUANT TO
CLEANUP AND ABATEMENT ORDER NO. 97-118, FORMER POWERINE / CENCO
REFINERY, 12345 LAKELAND ROAD, SANTA FE SPRINGS, CALIFORNIA, (SCP NO. 0318A,
SITE ID NO. 2040071)**

Mr. Barranco:

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) is the state regulatory agency responsible for protecting water quality in Los Angeles and Ventura Counties, including the above-referenced site (Site). To accomplish this, the Regional Board issues investigative orders, cleanup and abatement orders, waste discharge requirement permits, tank cleanup orders, and other directives authorized by the Porter- Cologne Water Quality Control Act or the California Health and Safety Code.

You are subject to Cleanup and Abatement Order (CAO) No. 97-118 issued to Powerine Oil Company (Powerine) on August 25, 1997, pursuant to California Water Code section 13304. CAO 97-118 ordered Powerine, as the responsible party, to investigate, cleanup and abate soil contamination and groundwater pollution at, and groundwater pollution emanating from, the subject facility at 12345 Lakeland Road in Santa Fe Springs, California. The requirements of CAO 97-118 apply to Lakeland Development Company as the successor to Powerine. The Department of Toxic Substances Control (DTSC) is coordinating with Regional Board staff to review site documents and thereby ensure that risks to human health are addressed by your investigations.

The Regional Board has received the *Second Quarter Groundwater Monitoring Report*, dated June 25, 2010 and submitted by your consultant, Murex Environmental. A large number of wells sampled in the monitoring program no longer have groundwater and hydrocarbon impacts cannot be determined. We have thus determined that additional work is necessary to maintain groundwater monitoring capability in groundwater beneath, and extending down-gradient from, the Site. You shall submit a workplan for complete delineation of the hydrocarbon impacts to groundwater originating from the Site. The groundwater workplan shall include north-to-south and east-to-west cross sections depicting hydrostratigraphic units beneath the Site interpreted from borehole logs, existing and proposed groundwater monitoring wells with depth and perforation intervals, and historical and current groundwater levels. Submit this Groundwater Monitoring Workplan to the Regional Board and the DTSC by **September 3, 2010**.

The Regional Board received the *Revised Off-Site Soil Gas Survey Workplan*, dated August 14, 2007, approved it in a letter dated January 11, 2008, and extended the due date to August 29, 2008 in a June 20, 2008 letter. Regional Board staff understand the execution of the workplan has been prevented due to property access and financial issues, which have since been resolved. You shall submit a revised soil gas

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July 21, 2010

survey workplan that incorporates delineation of elevated volatile organic compound (VOCs) concentrations in soil gas, offsite to the south, beneath Lakeland Road and beyond as necessary. Propose sample locations to assess VOC concentrations in the soil gas in the Metropolitan State Hospital facility. Include a health and safety plan, and soil gas investigation quality assurance (QA)/ quality control (QC) protocol. Submit this Revised Off-Site Soil Gas Assessment Workplan to the Regional Board and DTSC by **September 3, 2010**.

The Regional Board received the *Free Phase Petroleum Hydrocarbon Investigation Work Plan*, dated August 31, 2007, approved it in a letter dated January 11, 2008, and extended the due date to August 29, 2008 in a June 20, 2008 letter. No technical report has been submitted and your ability to determine the extent and thickness of free-phase petroleum hydrocarbons is severely restricted by the falling groundwater levels noted above. You shall submit an update to the *Free Phase Petroleum Hydrocarbon Investigation Work Plan* including recent data and data gaps, and a proposed schedule for the completion of the work. Submit this Revised Free Phase Petroleum Hydrocarbon Investigation Workplan to the Regional Board and DTSC by **September 3, 2010**.

The Regional Board has received the *Supplemental Soil Investigation Report*, dated June 8, 2009. With this submission, sufficient information regarding site contaminants and characteristics has been accumulated to allow the evaluation of potential remedial technologies that could be included in a Remedial Action Plan. You shall submit a workplan to perform pilot and/or bench scale testing on considered remedial technologies for soil and groundwater. The purpose of the testing is to develop and confirm design parameters for remediation. The workplan must include the technologies, method of testing, and an implementation schedule. Furthermore, the testing plan must address the Site specific conditions and must be representative of the various soil and contaminant conditions at the Site. Submit this Pilot Testing Workplan to the Regional Board and DTSC by **September 17, 2010**.

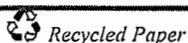
The workplans are required under CAO No. 97-118. Pursuant to section 13308 of the California Water Code you are required to submit the above-referenced workplans by the due dates. Failure to submit the required technical reports/workplans by the specific due dates may result in civil liability administratively imposed by the Regional Board in an amount up to one thousand dollars (\$1,000) for each day the technical reports/workplans are not received.

Please note that effective immediately, the Regional Board requires you to include a perjury statement in all work plans and reports submitted under 13267 orders and CAOs. The perjury statement shall be signed by a senior authorized representative of Lakeland Development Company (and not by a consultant). The statement shall be in the following format:

"I [NAME], do hereby declare under penalty of perjury under the laws of California, that I am [JOB TITLE] for [Subject Site], that I am authorized to attest to the veracity of the information contained in the reports described herein, and that the information contained [NAME AND DATE OF REPORT] is true and correct, and that this declaration was executed at [PLACE], [STATE], on [DATE]."

The State Water Resources Control Board (State Water Board) adopted regulations requiring the electronic submittals of information over the Internet using the State Water Board GeoTracker database.

California Environmental Protection Agency



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Mr. Mike Barranco, Lakeland Development. Co. - 3 -
Former Powerline / CENCO Refinery

July 21, 2010

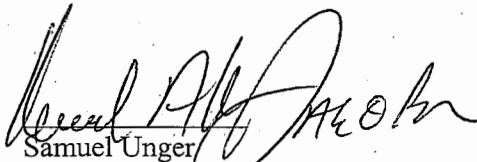
You are required not only to submit hard copy reports required in this Order but also to comply by uploading all reports and correspondence prepared to date and additional required data formats to the GeoTracker system. Information about GeoTracker submittals, including links to text of the governing regulations, can be found on the Internet at the following link:

http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal

As presented in State Water Resources Control Board Resolution 92-49, professionals should be qualified, licensed where applicable, and competent and proficient in the fields pertinent to the required activities. Moreover, the final report submitted to this Regional Board must be reviewed, signed and stamped by a California registered geologist, or a California registered civil engineer with at least five years hydrogeologic experience. Furthermore, the California Business and Professions Code Sections 6735, 7835, and 7835.1 require that engineering and geologic evaluations and judgments be performed by or under the direction of a registered geologist or registered civil engineer. A statement is required in the final report that the registered professional in responsible charge actually supervised or personally conducted all the work associated with the work plan and final report.

If you have any questions regarding this project, please contact Don Indermill of my staff at (213) 576-6811 or dindermill@waterboards.ca.gov.

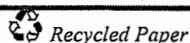
Sincerely,



Samuel Unger
Interim Executive Officer

cc: Steve Hariri, Department of Toxic Substances Control, Cypress, CA
Paris Hajali, Murex Environmental Inc., Tustin CA
David Isola, Isola & Ruiz, LLP, Lodi, CA

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California Regional Water Quality Control Board Los Angeles Region

320 West Fourth Street, Suite 200, Los Angeles, California 90013
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<http://www.waterboards.ca.gov/losangeles>



Linda S. Adams
Acting Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

February 15, 2011

Mr. Mike Barranco
Lakeland Development Company
12345 Lakeland Road
Santa Fe Springs, California 90670

SUBJECT: APPROVAL OF WORK PLAN FOR FREE PHASE PETROLEUM HYDROCARBON INVESTIGATION ADDENDUM, PURSUANT TO CALIFORNIA WATER CODE SECTION 13304 CLEANUP AND ABATEMENT ORDER NO. 97-118

SITE: FORMER POWERINE / CENCO REFINERY, 12345 LAKELAND ROAD, SANTA FE SPRINGS, CALIFORNIA, (SCP NO. 0318A, SITE ID NO. 2040071)

Dear Mr. Barranco:

Regional Board staff have received and reviewed the *Free Phase Petroleum Hydrocarbon (FPPH) Investigation Status Report*, dated September 3, 2010, prepared and submitted on your behalf by Murex Environmental. The Status Report includes an Addendum to an FPPH Work Plan previously approved by the Regional Board on January 11, 2008.. The original Work Plan was submitted in response to the Regional Board's April 3, 2007 directive letter pursuant to California Water Code (CWC) section 13304 Cleanup and Abatement Order No. 91-118.

An oil refinery was operated at the Site from the 1930's until 1995 and the surrounding properties are currently used for commercial and industrial purposes. The refinery operations resulted in impact to the subsurface; primarily with petroleum hydrocarbons.

The Work Plan Addendum proposes to reposition FPB-09, perform a bail down test of FPPH recharge, and perform continuous coring during well replacement installations to be proposed in the near future. The FPPH Work Plan Addendum is approved as proposed. The Regional Board understands that the soil coring will also be described in the well replacement work plan that will be submitted shortly.

Pursuant to section 13304 of the CWC and Order No. 97-118, you are required to submit a technical report, including the FPPH Investigation results, to the Regional Board by **June 30, 2011**, for our review and approval. The new due date to submit the above technical report is an amendment to the existing CWC section 13304 Cleanup and Abatement Order No. 91-118.

The Regional Board requires you to include a perjury statement in all work plans and reports submitted under Cleanup and Abatement Orders. The perjury statement shall be signed by a senior authorized representative at your company (and not by a consultant). The statement shall be in the following format:

California Environmental Protection Agency

Mr. Mike Barranco
Lakeland Development Company

- 2 -

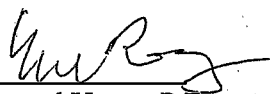
February 15, 2011

"I [NAME], do hereby declare, under penalty of perjury under the laws of the State of California, that I am [JOB TITLE] for [NAME OF RESPONSIBLE PARTY\DISCHARGER], that I am authorized to attest to the veracity of the information contained in the report(s) described herein, and that the information contained in [NAME AND DATE OF REPORT] is true and correct, and that this declaration was executed at [PLACE], [STATE], on [DATE]."

Pursuant to section 13350 of the CWC, failure to submit the required technical report by **June 30, 2011**, or failure to comply with provisions of Cleanup and Abatement Order No. 97-118, may result in civil liability penalties administratively imposed by the Regional Board in an amount up to five thousand dollars (\$5,000) for each day the technical report is not received and without further warning.

Should you have any questions related to this project, please telephone Don Indermill, of my staff, at (213) 576-6811, or email him at dindermill@waterboards.ca.gov.

Sincerely,

for 
Samuel Unger, P.E.
Executive Officer

cc: Jeremy Squire, Murex Environmental
Jeff Hawkins, Isola Law Group

Appendix B

ROST Fluorescence Response Data

Site: Santa Fe Springs, ca

Client: MUREX ENVIRONMENTAL

Date/Time: 4/28/2003 @ 12:41:25 AM

ROST Unit: III

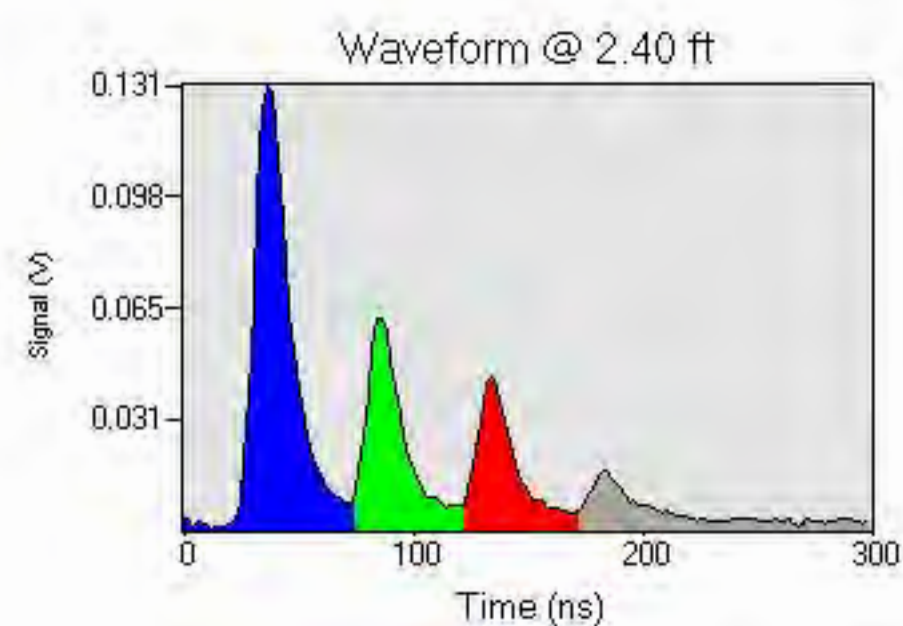
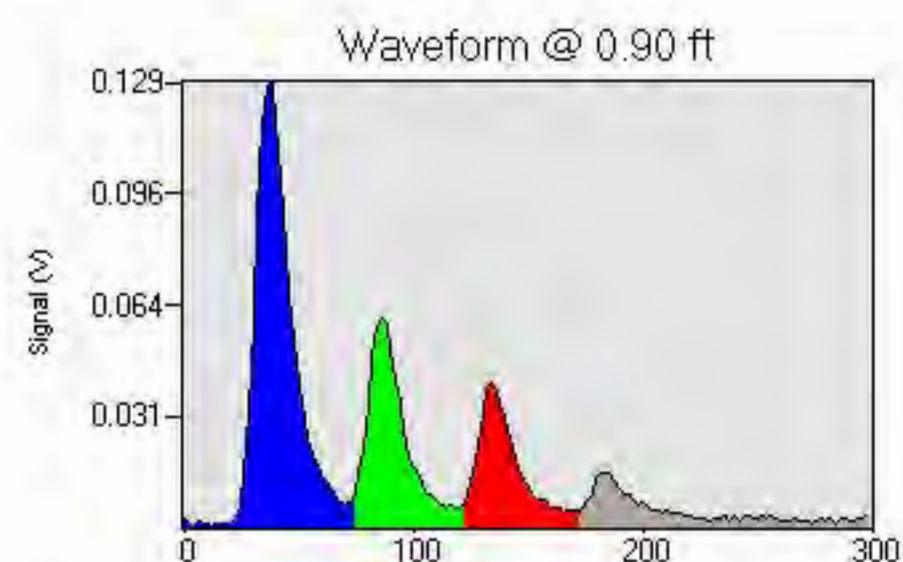
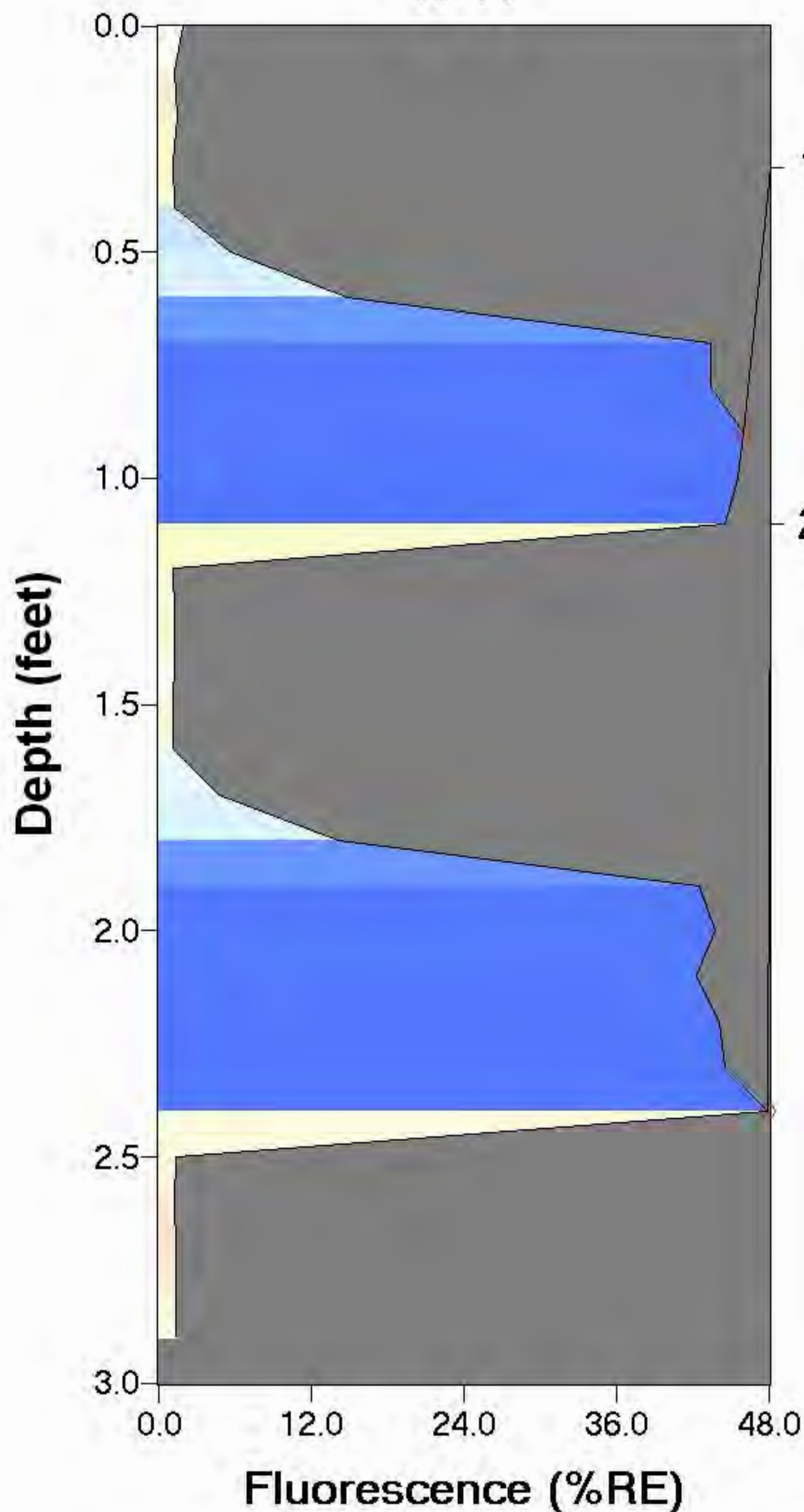
Operator: Daniel Garza

Fugro Job #: 0409110010

Max fluorescence: 47.90% @ 2.40 ft

Final depth BGS: 2.90 ft

W-11



ROST Fluorescence Response Data

Site: Santa Fe Springs, ca

Client: MUREX ENVIRONMENTAL

Date/Time: 4/28/2003 @ 12:51:45 AM

ROST Unit: III

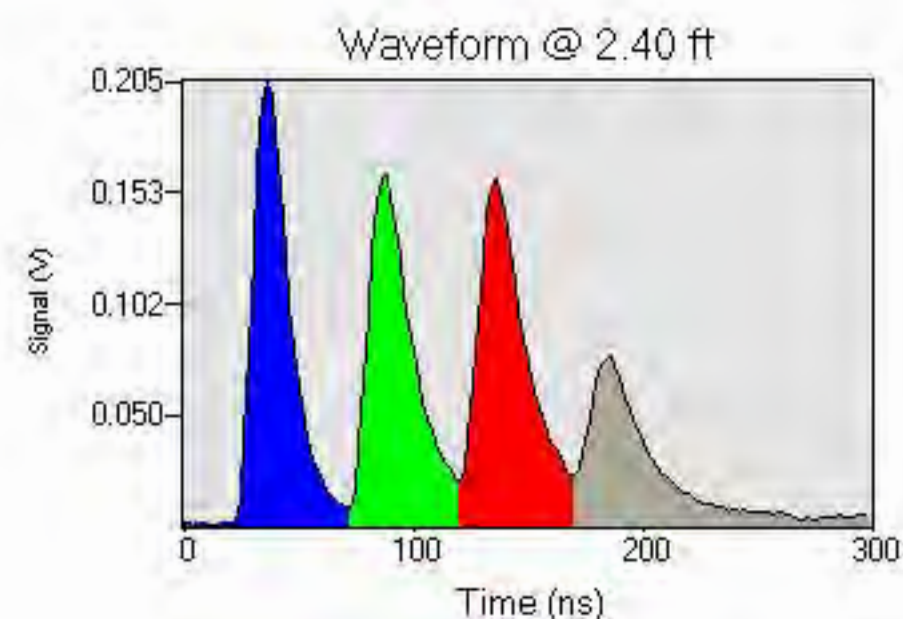
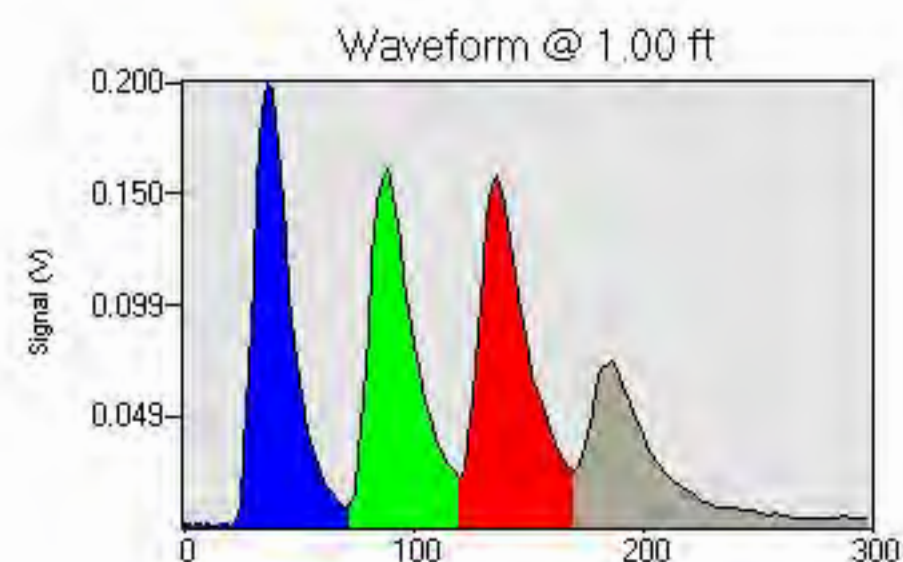
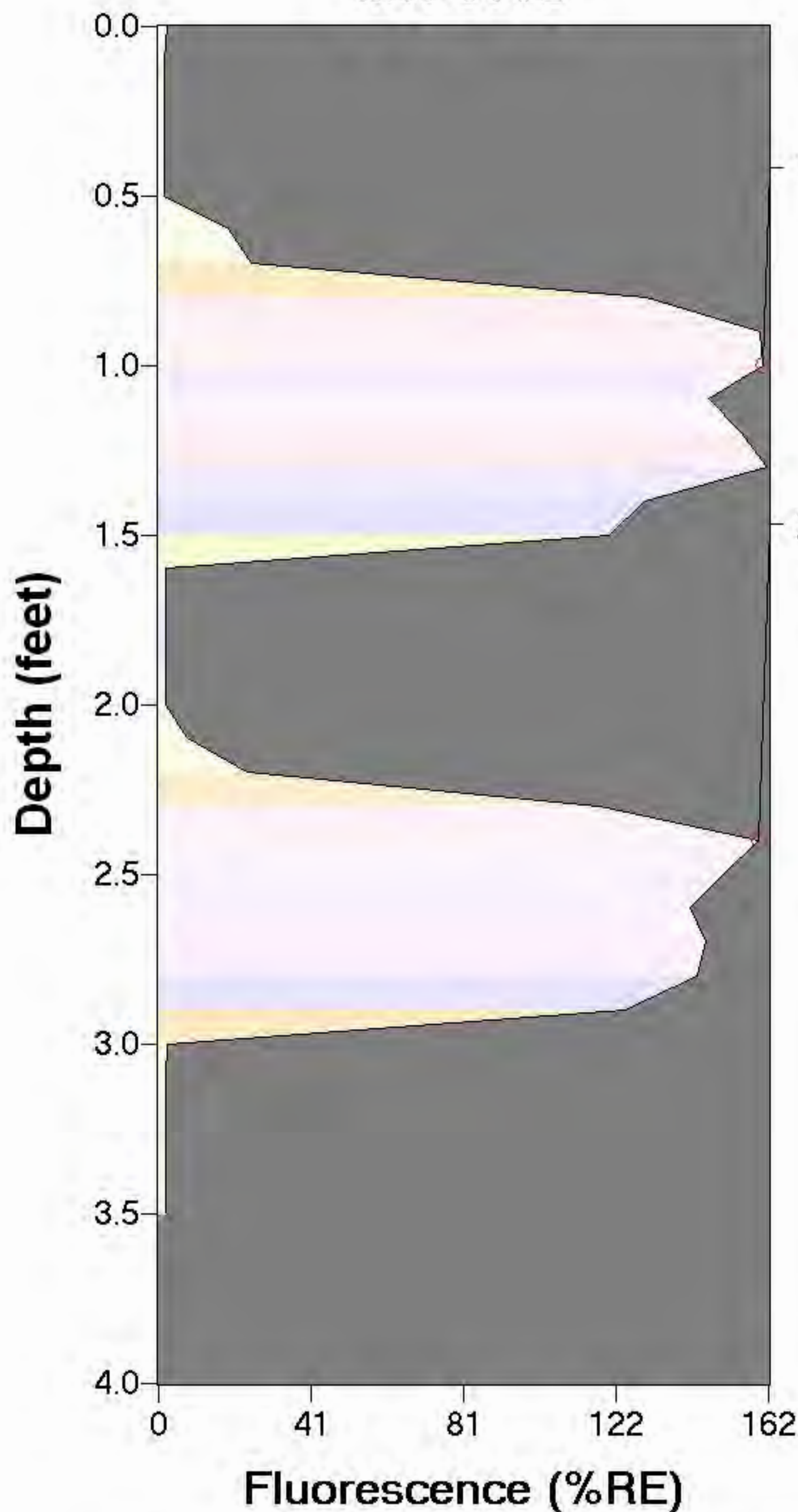
Operator: Daniel Garza

Fugro Job #: 0409110010

Max fluorescence: 161.95% @ 1.30 ft

Final depth BGS: 3.50 ft

MW-503B



ROST Fluorescence Response Data

Site: Santa Fe Springs, ca

Client: MUREX ENVIRONMENTAL

Date/Time: 4/28/2003 @ 12:28:11 AM

ROST Unit: III

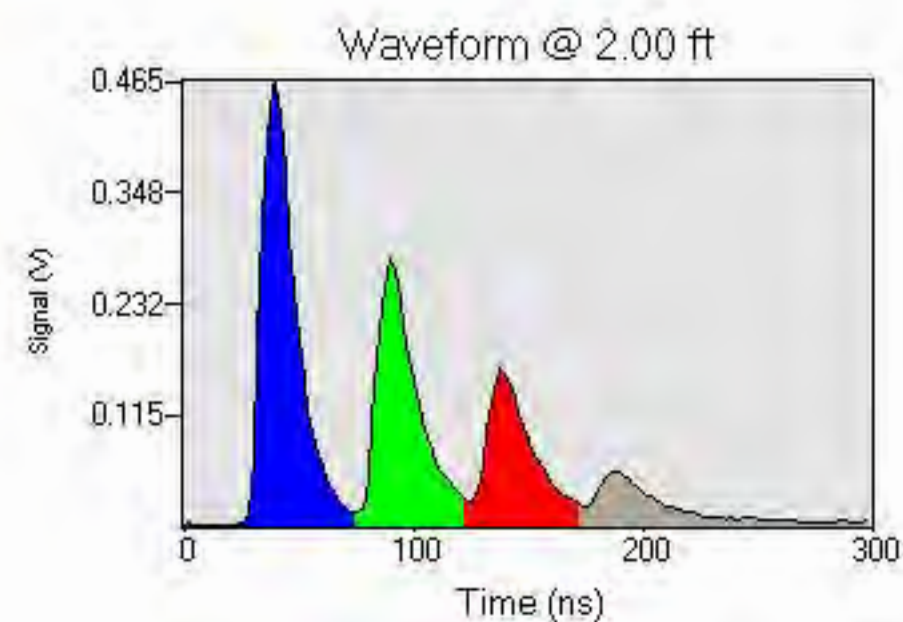
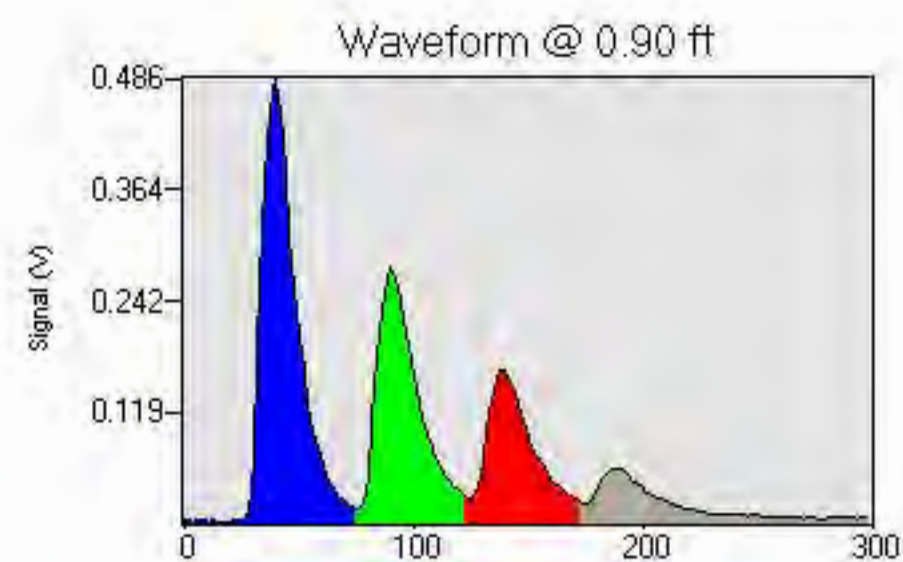
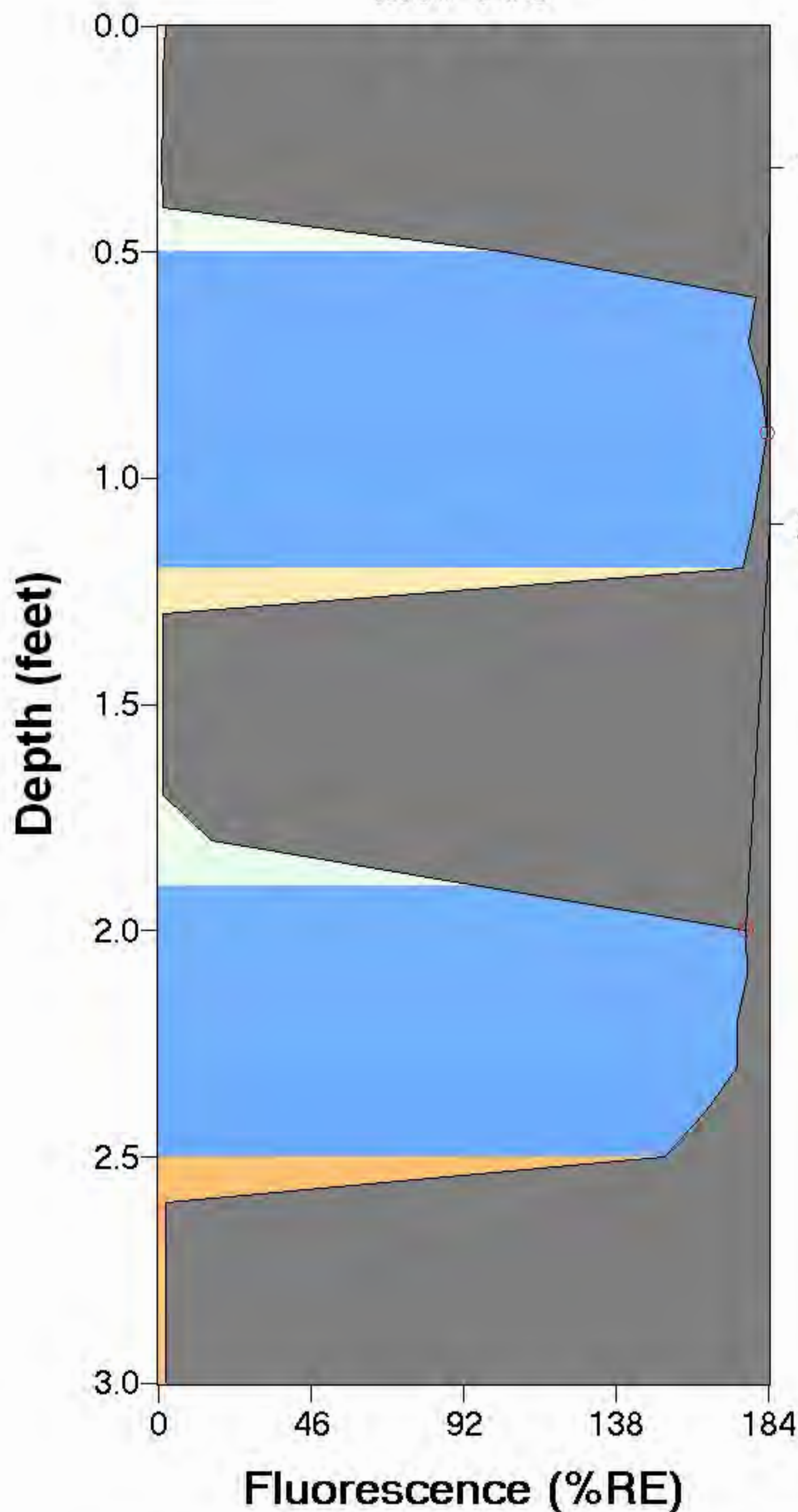
Operator: Daniel Garza

Fugro Job #: 0409110010

Max fluorescence: 183.12% @ 0.90 ft

Final depth BGS: 3.00 ft

MW-708



ROST Fluorescence Response Data

Site: Santa Fe Springs, ca

Client: MUREX ENVIRONMENTAL

Date/Time: 4/28/2003 @ 12:33:56 AM

ROST Unit: III

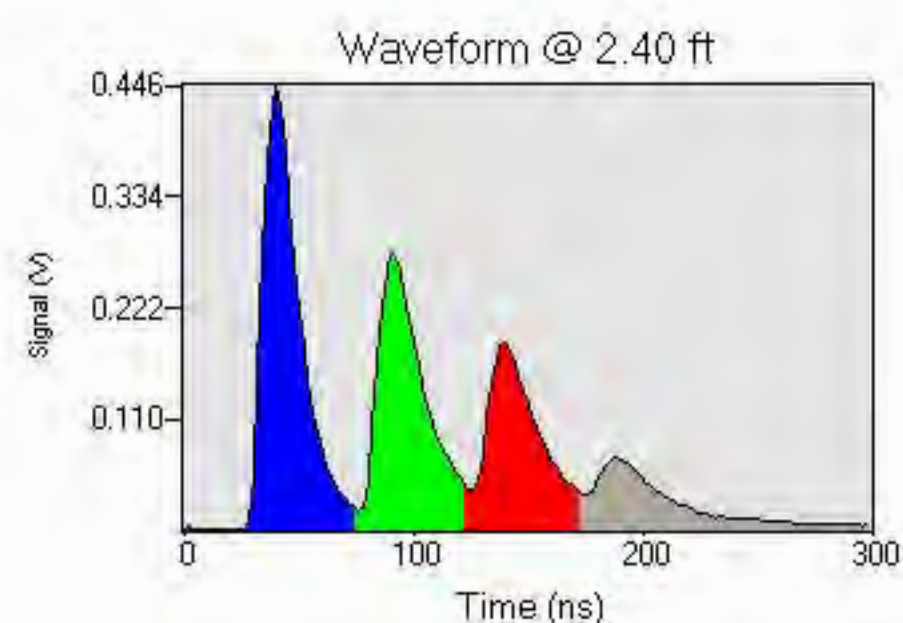
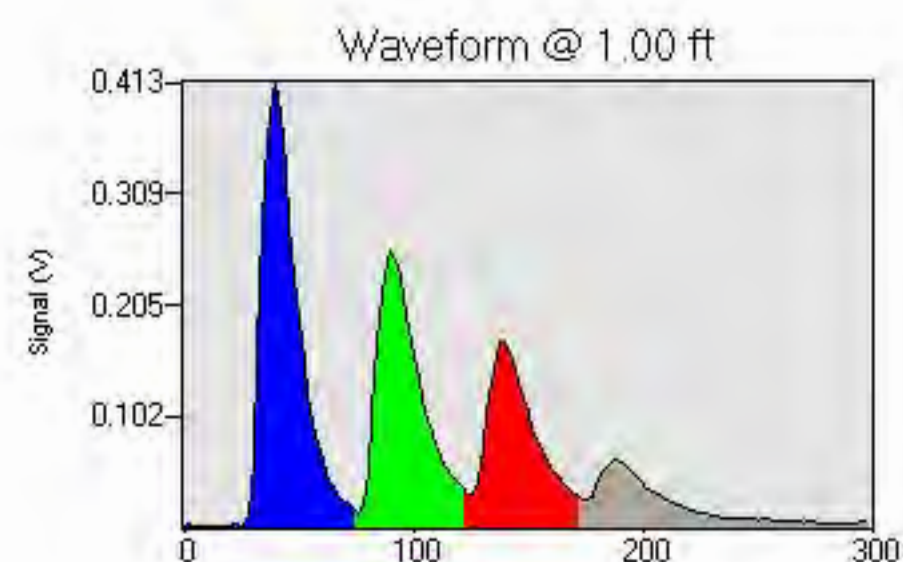
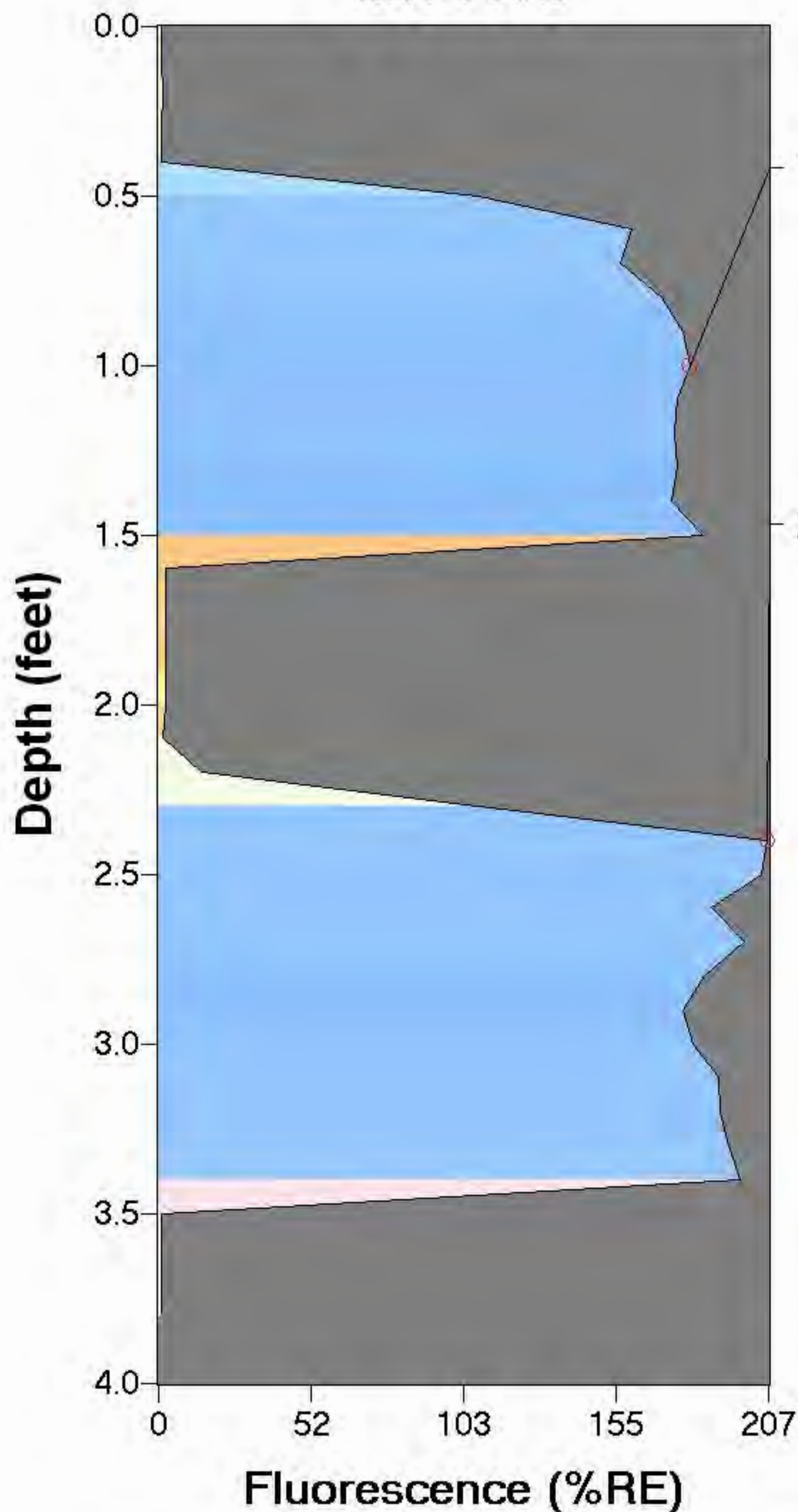
Operator: Daniel Garza

Fugro Job #: 0409110010

Max fluorescence: 206.13% @ 2.40 ft

Final depth BGS: 3.80 ft

MW-708B



ROST Fluorescence Response Data

Site: Santa Fe Springs, ca

Client: MUREX ENVIRONMENTAL

Date/Time: 4/28/2003 @ 12:38:04 AM

ROST Unit: III

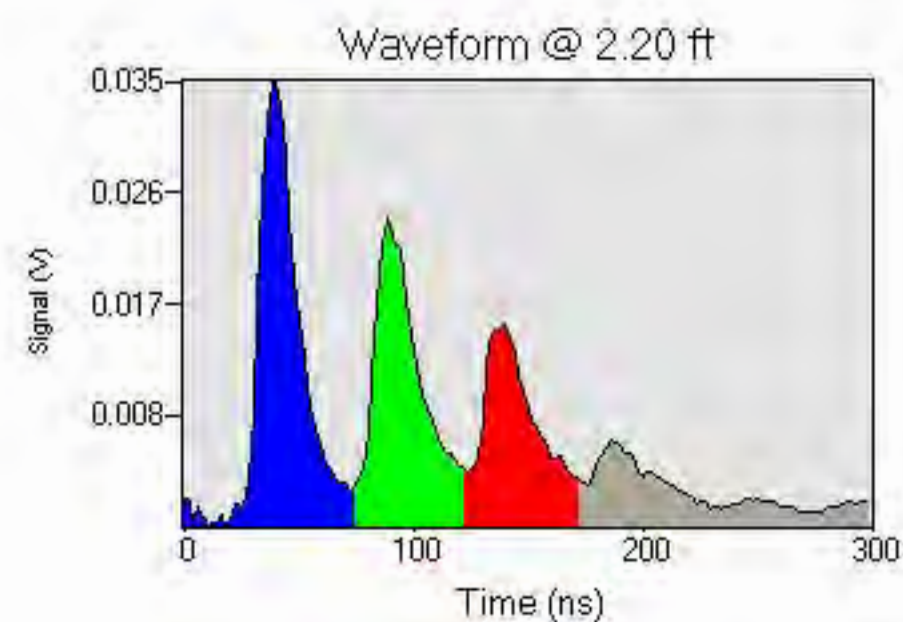
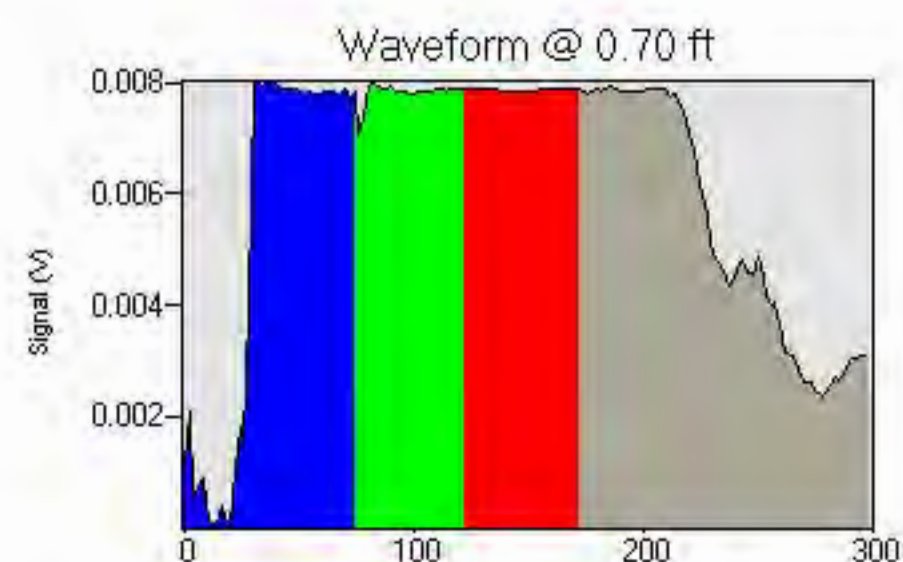
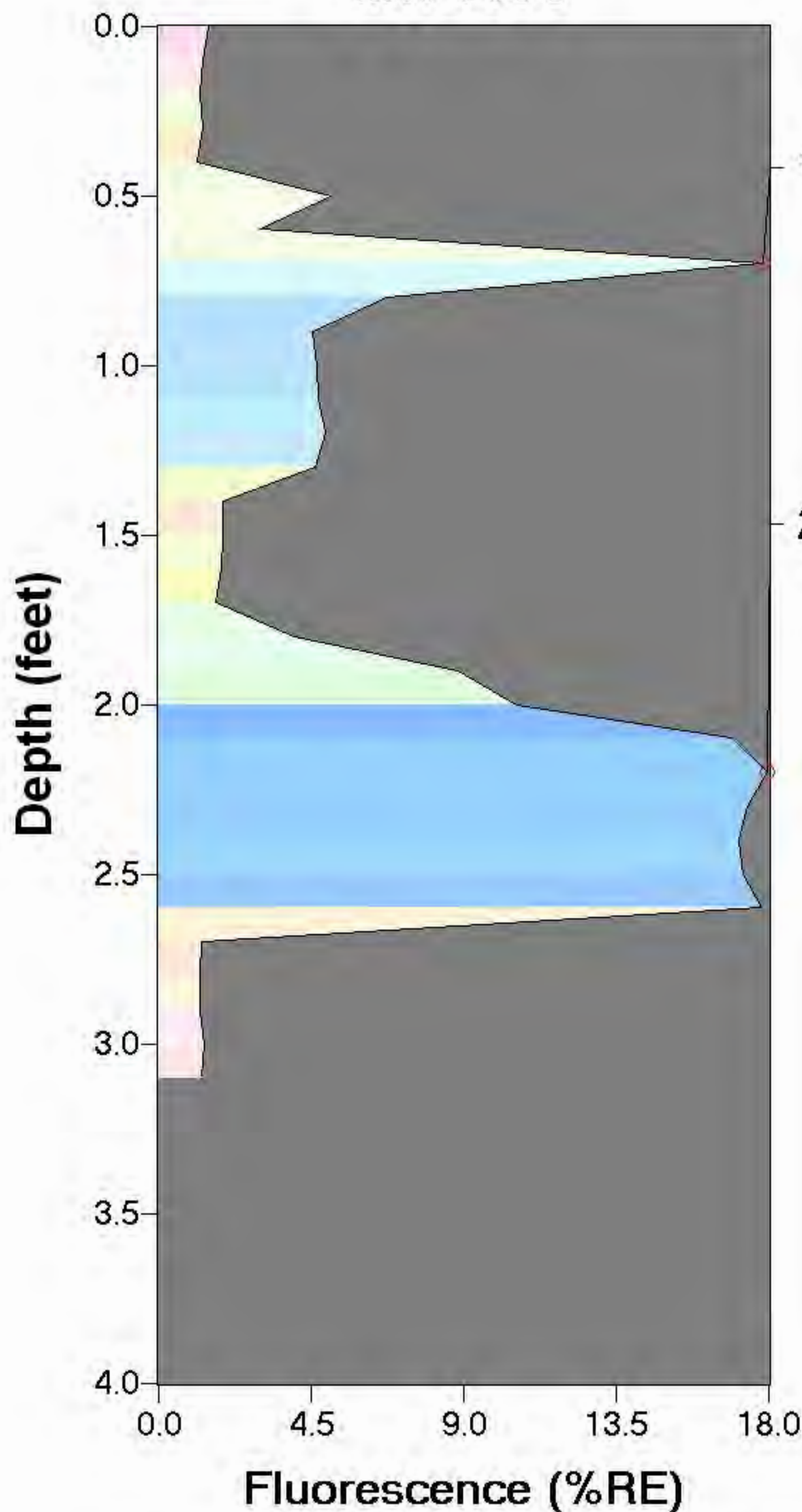
Operator: Daniel Garza

Fugro Job #: 0409110010

Max fluorescence: 17.99% @ 2.20 ft

Final depth BGS: 3.10 ft

MW-708C



ROST Fluorescence Response Data

Site: Santa Fe Springs, ca

Client: MUREX ENVIRONMENTAL

Date/Time: 4/28/2003 @ 12:46:43 AM

ROST Unit: III

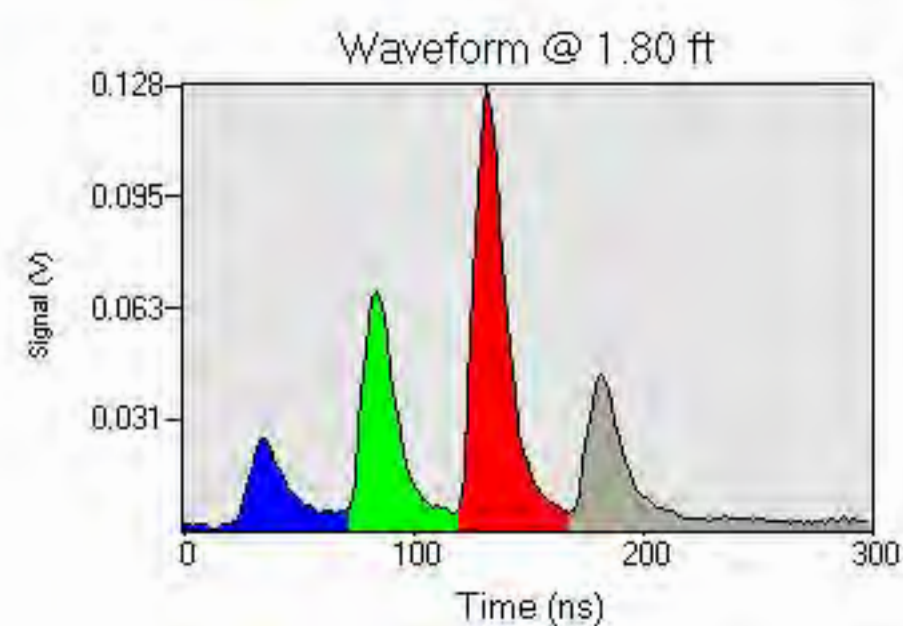
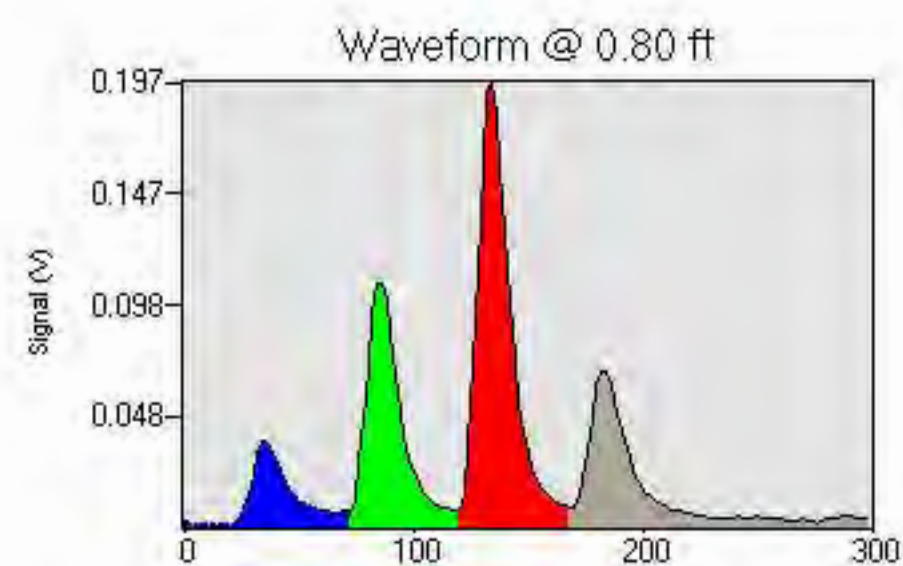
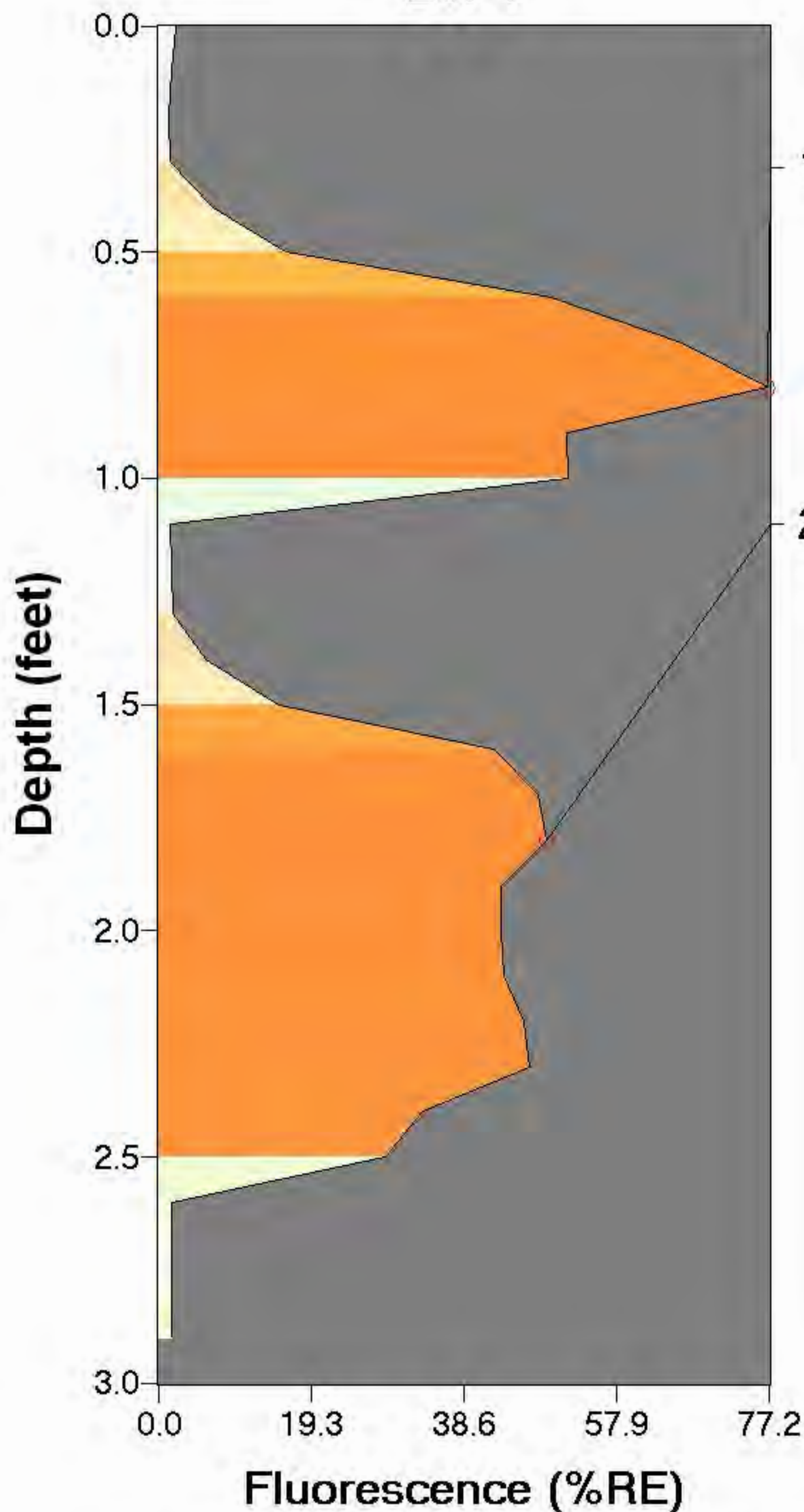
Operator: Daniel Garza

Fugro Job #: 0409110010

Max fluorescence: 77.04% @ 0.80 ft

Final depth BGS: 2.90 ft

EW-1



Appendix C



BORING LOG

BORING NO.

MW-701

Page 1 of 5

PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Jeremy Squire/Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	12/3/2010
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	12/6/2010

Elevation	136.87	ft.	Datum	Boring Location	West side of Refinery near MW-101
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> Cutting Head
Hammer Type					<input type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input checked="" type="checkbox"/> Automatic
Drilling Mud					<input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None
Total Depth					133'
Drilling Notes: Samples for visual-manual ID only					

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							3" Road base Hand auger first 5 feet														
5			5'		0 0	ML	Dark brown silt with sand, moist, no odor						5	20	75						
10			10'-11.5'		0 0	SM	Light brown silty sand, moist, no odor						55	45							
15			15'-16.5'		0 0	SM	Light gray silty sand, moist, slight VOC odor						75	25							
20			20'-21.5'		0 0	SM	Olive gray silty sand, moist, no odor						5	75	20						

Water Level Data				Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core	Riser Pipe	Boring Depth (Linear ft.)	133'
			First Water	Stabilized Water					
					T	Thin Wall Tube	Screen	Sample Method	Cal Mod Split Spoon
					U	Undisturbed Sample	Filter Sand	Number of Samples	
					S	Split Spoon Sample	Cuttings		
					G	Geoprobe	Grout		
							Concrete		
							Bentonite Seal		
BORING NO.								MW-701	

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

MW-701

Page 2 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
20			20'-21.5'			0.0	SM	Olive gray silty sand, moist, no odor										
25			25'-26.5'			0.0	SM/ML	Light brown silty sand/sandy silt, moist, no odor					50	50				
30			30'-31.5'			0.0	SM	Brown silty sand, moist, no odor			5	10	50	35				
35			35'-36.5'			0.0	SP-SM	Dark brown poorly graded sand with silt, moist, no odor			25	25	40	10				
40			40'-41.5'			0.0	SM	Dark brown silty sand, moist, no odor			25	25	25	25				
45			45'-46.5'			0.0	SP	Brown poorly graded sand with silt, moist, no odor				10	80	10				
50			50'-51.5'			0.0	SP-SM	Dark brown poorly graded graded sand with silt, moist, no odor			40	40	10	10				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-701

Page **3** of **5**

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
50			50'-51.5'		0.0	SP-SM	Dark brown poorly graded sand with silt, moist, no odor										
55			55'-56.5'		0.0	SW-SM	Light brown well graded sand with silt, moist, no odor			30	30	30	10				
60			60'-61.5'		0.0	SW-SM	SAA			30	30	30	10				
65			65'-66.5'		0.0	SP-SM	Light brown poorly graded sand with silt	5	5	20	60	10					
70			70'-71.5'		0.0	SW-SM	Light brown well graded sand with silt and gravel	10	10	20	20	30	10				
75			75'-76.5'		2.9	SP-SM	Olive gray poorly graded sand with silt, moist, VOC odor					90	10				
80			80'-81.5'		0.0	SP-SM	SAA					90	10				
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-701

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80			80'-81.5'				0.0												
85			85'-86.5'				50.7	SP-SM	Light gray poorly graded sand with silt, moist, strong VOC odor					90	10				
90			90'-91.5'				9.8	SP-SM	Olive gray poorly graded sand with silt, moist, VOC odor			5	5	80	10				
95			95'-96.5'				2.5	SP-SM	Dark gray poorly graded sand with silt, moist, VOC odor			5	5	80	10				
100			100'-101.5'				0.0	SM	Greenish gray silty sand, moist, no odor				10	75	15				
105			105'-106.5'				0.0	SM	SAA First water at 106.08				10	75	15				
110			110'-111.5'				11.1	SM	Olive gray silty sand, moist, strong VOC odor			5	10	70	15				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.







NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

MW-701

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
110			110'-111.5'		0.0	SM	Olive gray silty sand, moist, strong VOC odor										
115			115'-116.5'		0.0	SM	SAA Possible heaving sands			5	10	70	15				
120			120'-121.5'		0.0	SP-SM	Dark gray poorly graded sand with silt, wet, no odor	5	5	10	70	10					
125			125'-126.5'		0.0	SM	Dark gray silty sand, wet, no odor			5	25	50	20				
130			130'-131.5'		0.0	SM	SAA				20	50	30				
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None

Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High

Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

MW-702

Page 1 of 5

PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	12/14/2010
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	12/15/2010

Elevation	140.90	ft.	Datum	Boring Location	South side of construction office/300' north of gate 4
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Sonic - Spider
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod <input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input type="checkbox"/> Winch	<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track <input type="checkbox"/> Roller Bit	<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger <input checked="" type="checkbox"/> Cutting Head	Drilling Notes: Samples for visual-manual ID only

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							3" Road base Hand auger first 5 feet														
5	100%	14/21/30	5'		0 0	ML	Dark brown silt with sand, moist, no odor						25	75							
10	100%	10/14/14	10'-11.5'		0 0	ML	Light brown silt with sand, moist, no odor						30	70							
15	80%	4/6/14	15'-16.5'		0 0	SP-SM	Greenish brown poorly graded sand with silt, moist, no odor						10	80	10						
20	90%	11/25/31	20'-21.5'		0 0	ML	Olive gray sandy silt, moist, no odor						5	35	60						

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.) 131'	
			First Water	Stabilized Water	T	Thin Wall Tube		Screen		
					U	Undisturbed Sample		Filter Sand	Sample Method Cal Mod Split Spoon	
					S	Split Spoon Sample		Cuttings		
					G	Geoprobe		Grout	Number of Samples	
								Concrete		
								Bentonite Seal	BORING NO. MW-702	

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.



NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

MW-702

Page 2 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test				
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength	
20	90%	11/25/31	20'-21.5'			0.0	ML												
25	70%	21/35/40	25'-26.5'			3.2	SP-SM	Light gray poorly graded sand with silt,dry, no odor				20	70	10					
30	100%	9/13/20	30'-31.5'			0.0	ML	Light brown sandy silt with gray mottling, moist, no odor				5	25	70					
35	100%	15/18/23	35'-36.5'			0.0	ML	Yellowish brown sandy silt with gray and amber mottling, moist, no odor					30	70					
40	90%	18/21/32	40'-41.5'			0.0	ML	Light greenish gray sandy silt, moist, no odor					20	80					
45	80%	13/26/33	45'-46.5'			0.0	SM	Olive gray silty sand, moist, no odor				5	50	45					
50	75%	19/37/50	50'-51.5'			0.0	SP	Light gray poorly graded sand, moist, no odor				25	70	5					
									C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-702

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
50	75%	19/37/50	50'-51.5'			0.0	SP											
55	60%	19/27/35	55'-56.5'			0.0	SP		Light gray poorly graded sand, moist, no odor			5	75	15	5			
60	90%	21/29/33	60'-61.5'			0.0	ML	Dark gray sandy silt, moist, 'tar-like' odor				5	25	70				
65	45%	20/30/37	65'-66.5'			0.0	SP-SM	Light gray poorly sorted sand with silt with dark gray non-VOC staining, rounded to subrounded fine gravels, moist, non-VOC odor	5	5	20	60	10					
70	40%	12/30/39	70'-71.5'			0.0	SP	Light gray poorly graded sand with subrounded fine gravels, moist, slight non-VOC odor	5	5	75	15						
75	35%	12/15/28	75'-76.5'			0.0	SP	Gray poorly graded sand with silt with subrounded to subangular gravels, moist, slight non-VOC odor	5	15	60	15	5					
80	25%	50-4"	80'-81.5'			0.0	SP	Olive gray poorly graded sand with silt, moist, slight odor			5	60	30	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-702

Page 4 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	25%	50-4"	80'-81.5'				0.0												
85	40%	22/50+	85'-86.5'				0.0	SP-SM	Olive to dark gray poorly sorted sand with silt, moist, slight odor				10	80	10				
90	45%	50-5"	90'-91.5'				38.7	SP-SM	Dark graypoorly graded sand with silt, moist, VOC odor	3	7	10	60	15	5				
95	40%	30/50+	95'-96.5'				450.0	SP-SM	Dark gray poorly graded sand with silt, moist, strong hydrocarbon odor		10	10	60	15	10				
100	50%	29/50+	100'-101.5'				67.0	SP	Dark gray poorly graded sand with gravels	5	10	20	50	10	5				
105	35%	20/50+	105'-106.5'				1.7	SP	Dark gray poorly graded sand, moist, slight hydrocarbon odor				20	75	5				
									First water at 108' - 109' bgs										
110	70%	20/43/50	110'-111.5'				0.0	SP	Dark gray poorly graded sand, wet, slight odor			5	60	30	5				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.


NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength	
110	70%	20/43/50	110'-111.5'		0.0		Dark gray poorly sorted sand, wet, slight odor Possible heaving sands											
115	100%	13/18/23	115'-116.5'		0.0	SP			3	12	50	30	5					
120	90%	NA	120'-121.5'		0.0	SP		SAA	3	17	50	25	5					
125	90%	NA	125'-126.5'		0.0	SP		SAA	3	17	50	25	5					
130	80%	NA	130'-131.5'		0.0	SP		SAA	3	17	60	15	5					
135																		
140																		
								C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None

Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High

Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Robert Hess/Frane Sasic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	12/8/2010
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	12/15/2010

Elevation	134.73	ft.	Datum	Boring Location	Southwest corner of Refinery near MW-201
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> Cutting Head
				Hammer Type	<input type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input checked="" type="checkbox"/> Automatic
				Drilling Mud	<input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None
				Total Depth	130'
Drilling Notes: Samples for visual-manual ID only					

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							Dirt cover Hand auger first 5 feet Black silts first five feet														
5	100%	20/50+	5'		0 0	ML	Dark brown silt with sand, moist, no odor							5	20	75					
10	95%	9/12/25	10'-11.5'		0 0	SP-SM	2.5Y 6/3 Light gray poorly sorted sand with silt, dry, no odor							10	80	10					
15	95%	7/32/44	15'-16.5'		0 0	SP-SM	SAA							10	80	10					
20	95%	15/20/37	20'-21.5'		0 0	SP	5Y 6/2 Light olive gray poorly graded sand, moist, no odor							5	90	5					

Water Level Data				Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core	<input type="checkbox"/> Riser Pipe <input type="checkbox"/> Screen <input type="checkbox"/> Filter Sand <input type="checkbox"/> Cuttings <input type="checkbox"/> Grout <input type="checkbox"/> Concrete <input type="checkbox"/> Bentonite Seal	Boring Depth (Linear ft.)	Sample Method
			First Water	Stabilized Water					
					T	Thin Wall Tube		130'	Cal Mod Split Spoon
					U	Undisturbed Sample			
					S	Split Spoon Sample			
					G	Geoprobe			
								BORING NO.	
								MW-703	

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test					
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength		
20	95%	15/20/37	20'-21.5'				0.0														
25	95%	6/10/20	25'-26.5'				0.0	ML	5Y 4/3 Olive sandy silt, moist, no odor					5	45	50					
30	95%	23/30/50	30'-31.5'				2.8	ML	5Y 4/2 Olive gray sandy silt, moist, no odor							40	60				
							5.0		Black "asphalt-like"staining at 33.5'												
35	95%	13/15/21	35'-36.5'				0.0	ML	5Y 4/1 Dark gray silt, moist, no odor							10	90				
40	15%	8/10/15	40'-41.5'			15.8	SP-SM	5Y 4/2 Olive gray poorly graded sand with silt, moist, slight odor				5	40	45	10						
45	25%	15/32/50+	45'-46.5'			3.8	SP	5Y 4/2 Olive gray poorly graded sand, moist, slight odor				5	70	20	5						
50	95%	50+	50'-51.5'			8.6	SP	5Y 6/2 Light olive gray poorly graded sand, moist, slight odor				10	80	10							
										C	F	C	M	F	FS	D	T	P	S		

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand		Fines		Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
50	95%	50+	50'-51.5'		8.6												
55	95%	30/50+	55'-56.5'		0.3	ML	7.5Y 4/6 10YR 3/4 Gradual color change in sample core 2.5Y 2/3 Silt					10	90				
60	95%	50+	60'-61.5'		0.0	SP	5Y 5/8, poorly graded sand				70	20	5				
65	95%	27/29/40	65'-66 5'		0.4	SW-SM	Staining: amber band 1/4" thick normal to core 2.5Y 6/1 gray well graded sand with silt and gravels, subrounded gravels <1" max size, sand subangular	30	25	20	15	10					
70	95%	10/20/43	70'-71 5'		0.4	SM	2.5Y 5/1 gray silty sand, subangular			15	70	15					
75	30%	9/15/33	75'-76.5'		0.1	SP	Olive gray poorly graded sand with silt, moist, VOC odor					90	10				
80	0%	10/28/43	80'-81.5'		NA		No Recovery										
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	0%	10/28/43	80'-81.5'				NA												
85	30%	19/50+	85'-86.5'				0.0	SP-SM	Grey poorly graded sand with silt, moist, no odor				15	75	10				
90	30%	42/50+	90'-91.5'				0.0	SW-SM	Grey well graded sand with silt, moist, no odor			30	40	20	10				
95	50%	40/50+	95'-96.5'				0.0	SW	Gray well graded sand, moist, no odor		5	40	40	10	5				
100	60%	45/50+	100'-101.5'				0.0	SP	Gray poorly graded sand, moist, no odor		5		15	65	10	5			
									First water at ~104										
105	30%	24/50+	105'-106.5'				15.2	SP	Gray poorly graded sand with gravel, wet, hydrocarbon odor	10	25	40	20	5					
110	100%	10/15/45	110'-111.5'				17.4	SP	SAA	10	25	40	20	5					
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.


NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
110	100%	10/15/45	110'-111.5'		17.4	SP	SAA 111' Gray poorly graded sand, wet , mild hydrocarbon odor	10	25	40	20	5					
115	100%	14/20/39	115'-116.5'		1.8	SP	Gray poorly graded sand, wet, mild odor	5		20	65	10					
120	100%	10/17/21	120'-121.5'		74.1	SP	Gray poorly graded sand, wet, strong odor	5	5	80	10						
125	100%	10/17/20	125'-126.5'		5.5	ML	Gray sandy silt, moist, mild odor			5	40	55					
130	75%	8/11/13	130'-131.5'		8.5	ML	SAA			5	40	55					
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None

Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High

Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Robert Hess/Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	12/6/2010
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	12/7/2010

Elevation	137.93	ft.	Datum	Boring Location	Lakeland Rd Loading Rack near MW-504
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod <input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input type="checkbox"/> Winch	<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track <input type="checkbox"/> Roller Bit	<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger <input checked="" type="checkbox"/> Cutting Head	Drilling Notes: Continuous Core

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							Asphalt cover Hand auger first 5 feet														
5	80%	NA	5'-10'		0 0	ML	10YR 4/5, moist, no odor						20		80						
10	80%	NA	10'-15'		0 0	ML	SAA Color change at 11' to 2.5Y 5/2, same lithology						20		80						
15	90%	NA	15'-20'		0 0	ML	SAA						20		80						
20	90%	NA	20'-25'		0 0	SM	17' - 18' more consolidated section with vigorous reaction to HCl, poss. Caliche 5Y 6/2 Light olive gray silty sand, moist, no odor						80		20						
							Losing sand, picking up more silts														

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core	<input type="checkbox"/>	Riser Pipe	Boring Depth (Linear ft.) 130'	
			First Water	Stabilized Water	T	Thin Wall Tube	<input type="checkbox"/>	Screen		
					U	Undisturbed Sample	<input type="checkbox"/>	Filter Sand	Sample Method	
					S	Split Spoon Sample	<input type="checkbox"/>	Cuttings	Number of Samples	
					G	Geoprobe	<input type="checkbox"/>	Grout	BORING NO.	
							<input type="checkbox"/>	Concrete	MW-704	
							<input type="checkbox"/>	Bentonite Seal		

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
20	90%	NA	20'-25'			0.0												
							ML	5Y 5/2 sandy silt, moist, no odor					30	70	R	L	M	L
25	80%	NA	25'-30'			0.0	SM	5Y 4/2 Olive gray silty sand, moist, no odor				5	65	30				
30	100%	NA	30'-35'			0.0	SM	SAA										
							ML	10Y 4/3 sandy silt, moist, slight odor				5	25	70				
35	60%	NA	35'-40'			9.0	SP	2.5Y 4/3 poorly graded sand, moist, no odor				5	90	5				
40	50%	NA	40'-45'			6.2	ML	5Y 4/2 Olive gray silt, moist, slight odor					10	90				
							SP	5Y 6/3 poorly graded sand, moist, slight odor			5	80	10	5				
45	50%	NA	45'-50'			8.6	SW	5Y 6/3 well graded sand, moist, slight odor				45	50	5				
50	60%	NA	50'-55'			9.5	SW	SAA			10	50	35	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand		Fines		Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
50	60%	NA	50'-55'		9.5												
55	75%	NA	55'-60'		270	ML	5Y 5/2 silt, moist, strong odor					5	95				
60	60%	NA	60'-65'		214	ML	SAA					40	60				
						SP	5Y 6/2 poorly graded sand, moist, strong odor				10	85	5				
65	60%	NA	65'-70'		227	SP	SAA				15	80	5				
					445		Staining: 3" dark gray band normal to core										
					434		Staining: 1" dark gray band normal to core										
70	50%	NA	70'-75'		170	SW	5Y 6/2 well graded sand, moist, strong odor				35	60	5				
75	50%	NA	75'-80'			SW	SAA				45	50	5				
							Staining: 1/4" amber band normal to core										
80	50%	NA	80'-85'			SW	SAA				45	50	5				
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	50%	NA	80'-85'						5Y 6/2 poorly graded sand, moist, hydrocarbon odor										
85	50%	NA	85'-90'				49.4	SP					35	60	5				
90	50%	NA	90'-95'				417	SP		SAA			30	65	5				
95	50%	NA	95'-100'				318	SW		5Y 6/1 well graded sand, moist, hydrocarbon odor			45	50	5				
100	50%	NA	100'-105'				423	SP		5Y 5/1 poorly graded sand, moist, hydrocarbon odor	5	60	30	5					
105	50%	NA	105'-110'				376	SP	5Y 5/1 poorly graded sand with gravel, moist, hydrocarbon odor	10	25	40	20	5					
									First water at ~109.5		5	50	40	5					
110	50%	NA	110'-115'				298	SP	5Y 3/1 poorly graded sand, wet, hydrocarbon odor			20	75	5					
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.


NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	50%	NA	110'-115'		298	SP	5Y 3/1 poorly graded sand, wet, strong odor			20	75	5					
115	70%	NA	115'-120'		702	SP	SAA, angular to subangular grains			20	75	5					
120	70%	NA	120'-125'		38.6	ML	Gley1 3/5G silt, moist, staining 124' Staining ends					5	95	S		M	M
125	60%	NA	125'-130'		0.0	ML	5Y 5/3 silt, dry, no odor					5	95	S		M	M
130					0.0	SP	5Y 3/1 poorly graded sand, wet, no odor		5	60	30	5					
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

MW-705

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sasic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	12/13/2010
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	12/14/2010

Elevation	139.16	ft.	Datum	Boring Location	Refinery near MW-202
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod <input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input type="checkbox"/> Winch	<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track <input type="checkbox"/> Roller Bit	<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger <input checked="" type="checkbox"/> Cutting Head	Drilling Notes: Samples for visual-manual ID only

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							Dirt cover Hand auger first 5 feet														
5	100%	10/12/2013	5'		0 0	ML	Dark brown silt with sand, moist, no odor						30	70							
10	90%	6/7/8	10'-11.5'		0 0	SP-SM	Light brown poorly graded sand with silt, moist, no odor				5	85	10								
15	80%	25/30/38	15'-16.5'		0 0	SP	Olive gray poorly graded sand, moist, no odor				5	90	5								
20	70%	17/26/35	20'-21.5'		0 0	SP-SM	Olive gray poorly graded sand with silt, moist, no odor				10	80	10								

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.)	130'
			First Water	Stabilized Water						
					T	Thin Wall Tube		Screen	Sample Method	Cal Mod Split Spoon
					U	Undisturbed Sample		Filter Sand	Number of Samples	
					S	Split Spoon Sample		Cuttings		
					G	Geoprobe		Grout		
								Concrete		
								Bentonite Seal		

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
20	70%	12/26/35	20'-21.5'			0.0												
25	70%	29/50+	25'-26.5'			0.0	SP	Light gray poorly graded sand, dry, no odor			75	20	5					
30	60%	11/25/27	30'-31.5'			0.0	SP	Dark gray poorly graded sand, moist, no odor			5	80	10	5				
								32'-34' more consolidated section with vigorous reaction to HCl										
35	95%	9/20/24	35'-36.5'			0.0	ML	5Y 4/1 Dark gray sandy silt, moist, no odor			5	25	70					
40	80%	12/21/32	40'-41.5'			0.0	ML	SAA			5	30	65					
45	65%	12/25/30	45'-46.5'			0.0	SP	Dark gray poorly graded sand, moist, no odor			5	80	10	5				
50	30%		50'-51.5'			0.0	SP	SAA			5	80	10	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-705

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
50	30%		50'-51.5'			0.0	SP											
55	65%		55'-56.5'			0.0	SP		Olive gray poorly graded sand, dry, no odor 2.5Y 2/3			80	15	5				
60	50%	13/31/38	60'-61.5'			0.0	SP		Gray poorly graded sand, dry, no odor		5	75	15	5				
65	70%	21/29/38	65'-66.5'			0.0	SP		Olive gray poorly graded sand, moist, no odor		5	75	15	5				
70	55%	28/45/45	70'-71.5'			0.0	SP		Dark gray poorly graded sand, moist, slight tar odor	5	10	60	20	5				
75	60%	20/37/50+	75'-76.5'			0.0	SP	Gray poorly graded sand, moist, slight tar odor			10	65	20	5				
80	70%	7/20/30	80'-81.5'			0.0	ML	Dark olive gray sandy silt, moist, no odor			5	30	65					
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	70%	7/20/30	80'-81.5'				0.0												
85	85%	19/33/38	85'-86.5'				0.0	ML	Greenish gray silt with sand, moist, no odor					25	75				
90	40%	17/31/50	90'-91.5'				199	ML	Dark gray sandy silt, moist, strong odor, noticeable staining			5	25	75					
95	20%	16/32/50	95'-96.5'				151	SP-SM	Dark gray poorly graded sand with silt, moist, strong odor, noticeable staining			5	60	25	10				
100	75%	9/50+	100'-101.5'				1734	ML	Dark gray sandy silt, moist, strong odor	5	5	5	15	70					
105	100%	19/37/32	105'-106.5'				2.9	ML	Greenish/olive gray silt with sand, moist, slight odor				25	75					
									First water at ~109										
110	90%	9/19/30	110'-111.5'				0.0	ML	Dark gray sandy silt, wet, no odor			5	5	20	70				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.


NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
110	90%	9/19/30	110'-111.5'		0.0	ML	Dark gray sandy silt, wet, no odor			5	5	20	70				
115	90%	8/17/20	115'-116.5'		0.0	SP	Dark gray poorly graded sand, wet, no odor		5	5	60	25	5				
120	80%	10/16/50	120'-121.5'		0.0	SP	SAA		5	10	70	10	5				
125	70%		125'-126.5'		0.0	SP	SAA		5	25	55	10	5				
130	80%		130'-131.5'		0.0	SP	SAA		10	50	30	10					
135	90%		133.5-135		0.0	SP	SAA		10	50	30	10					
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None

Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High

Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Robert Hess/Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	12/9/2010
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	12/10/2010

Elevation	139.68	ft.	Datum	Boring Location	Refinery near MW-103
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod <input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input type="checkbox"/> Winch	<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track <input type="checkbox"/> Roller Bit	<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger <input checked="" type="checkbox"/> Cutting Head	Drilling Notes: Samples for visual-manual ID only

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							Dirt cover Hand auger first 5 feet														
5	100%	9/19/2016	5'		1.3	ML	7.5Y 4/3 Brown, moist, no odor						30	70							
10	80%	7/16/20	10'-11.5'		0 0	SP	2.5Y 4/2 Dark garyish brown poorly graded sand, dry, no odor				5	90	5								
15	80%	11/23/50+	15'-16.5'		0 0	SP	2.5Y 6/1 Gray poorly graded sand, subangular-subrounded grains, moist, no odor			10	70	15	5								
20	75%	19/23/33	20'-21.5'		0 0	SP	2.5Y 5/1 Gray poorly graded sand, subangular - subrounded grains dry no odor			5	65	25	5								

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.) 132'	
			First Water	Stabilized Water	T	Thin Wall Tube		Screen		
					U	Undisturbed Sample		Filter Sand	Sample Method Cal Mod Split Spoon	
					S	Split Spoon Sample		Cuttings		
					G	Geoprobe		Grout	Number of Samples	
								Concrete		
								Bentonite Seal	BORING NO. MW-706	

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
20	75%	19/23/33	20'-21.5'			0.0	SP	2.5Y 5/1 Gray poorly graded sand, subangular - subrounded grains dry, no odor			10	70	15	5				
25	75%	11/22/38	25'-26.5'			0.0	SP	SAA			5	75	15	5				
30	100%	13/43/38	30'-31.5'			0.0	ML	5Y 4/2 Olive gray sandy silt, dry, no odor				5	20	75				
35	0%	13/18/21	35'-36.5'			NA		No Recovery: sampler lost down-hole										
40	95%	20/33/38	40'-41.5'			0.0	ML	2.5Y 4/4 Olive brown silt with sand, dry, no odor					25	75				
45	95%	16/20/30	45'-46.5'			0.0	SP	2.5Y 5/6 Light olive brown poorly graded sand, dry, no odor				80	15	5				
50	75%	27/50+	50'-51.5'			0.0	SP	5Y 5/3 Olive poorly graded sand, dry, no odor				65	30	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	0%	23/50+	80'-81.5'				NA		No Recovery										
85	15%	17/50+	85'-86.5'				1.1	SM	10YR 3/6 Dark yellowish brown poorly graded silty sand, dry, no odor				25	50	25				
90	30%	50+	90'-91.5'				0	SW	5Y 5/2 well graded sand with gravels max size 2"	20	20	20	20	20	T				
95	60%	27/50+	95'-96.5'				87.5	SM	Gley1 5/N silty sand, moist, odor				10	70	20				
100	50%	50+	100'-101.5'				0.8	SM	Gley1 4/5G silty sand, moist, slight odor					60	40				
105	75%	50+	105'-106.5'				1.2	SM	SAA					60	40				
									First water at ~110										
110	75%	28/50+	110'-111.5'				0.2	SP	Gley1 3/5G Dark greenish gray poorly graded sand, wet			5	70	20	5				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High


NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	75%	28/50+	110'-111.5'		0.2	SP	Gley1 3/5G Dark greenish gray, wet			5	70	20	5				
							From 110' to 132' color gradually changes from greenish hue to blueish hue										
115		NA	115'-116.5'		NA	SP	SAA			5	70	20	5				
120		NA	120'-121.5'		NA	SP	SAA			5	70	20	5				
125		NA	125'-126.5'		NA	SP	Gley2 4/5BG			5	70	20	5				
130		NA	130'-131.5'		NA	ML	Gley2 4/5BG silt, dry, no odor					10	90				
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	12/20/2010
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	12/23/2010

Elevation	128.86	ft.	Datum	Boring Location	Getty Drive southeast of MW-503B
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> Cutting Head
Hammer Type					<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
					<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
					<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Drilling Notes:					Samples for visual-manual ID only

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							4" Asphalt Hand auger first 5 feet														
5	100%	7/8/2016	5'		0.0	ML	Light brown silt with sand, moist, no odor							25	75						
10	90%	8/50+	10'-11.5'		0.0	ML	Light garyish brown sandy silt, moist, no odor							30	70						
15	70%	41/50+	15'-16.5'		0.0	SM	Brown silty sand, moist, no odor							5	60	35					
20	75%	23/30/37	20'-21.5'		0.0	SM	Light brown silty sand, moist, no odor							10	70	20					

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.) 135'	
			First Water	Stabilized Water	T	Thin Wall Tube		Screen		
					U	Undisturbed Sample		Filter Sand	Sample Method Cal Mod Split Spoon	
					S	Split Spoon Sample		Cuttings		
					G	Geoprobe		Grout	Number of Samples	
								Concrete		
								Bentonite Seal	BORING NO. MW-707	

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
20	75%	23/30/37	20'-21.5'				0.0	SM	Light brown silty sand, moist, no odor				10	70	20				
25	65%	17/23/28	25'-26.5'				0.0	SM	Olive brown silty sand, moist, no odor				5	65	30				
30	95%	12/17/20	30'-31.5'				2.3	ML	Light brown sandy silt, with gray and reddish mottling			3	7	20	70				
35	50%	18/23/32	35'-36.5'				1.5	SM	Dark gray silty sand, moist, slight odor				5	80	15				
40	30%	28/50+	40'-41.5'				1.4	SP	Light gray poorly graded sand, dry, no odor			5	50	40	5				
45	50%	14/21/50	45'-46.5'				5.9	ML	44' Dark gray sandy silt, moist, slight odor				5	40	55				
								SP	Light gray poorly graded sand, moist, slight odor				80	15	5				
								ML	49' Light brown silt with sand, moist, no odor					20	80				
50	40%	25/27/29	50'-51.5'				18.1	SP	Gray poorly sorted sand, moist, slight odor		5	20	50	20	5				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
50	40%	25/27/29	50'-51.5'			18.1	SP	Gray poorly graded sand, moist, slight odor		5	20	50	20	5				
55	90%	23/25/27	55'-56.5'			13.8	SM	Dark gray silty sand, moist, slight odor			2	18	60	20				
60	85%	13/17/20	60'-61.5'			58.9	ML	Light brown sandy silt, moist, slight odor				10	20	70				
65	70%	24/50+	65'-66.5'			42.5	SP-SM	Greenish gray poorly graded sand with silt, moist, slight odor			5	10	75	10				
70	60%	32/50+	70'-71.5'			8.7	SP	Light gray poorly graded sand, moist, no odor			5	50	40	5				
75	35%	35/50+	75'-76.5'			19.6	SP	Olive gray poorly graded sand, moist, slight odor			10	50	35	5				
80	35%	35/50+	80'-81.5'			315	SP	Light gray poorly graded sand, moist, hydrocarbon odor			5	60	30	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

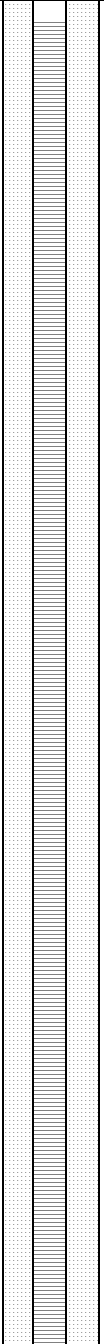
NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	35%	35/50+	80'-81.5'				315	SP	Light gray, moist, hydrocarbon odor			5	60	30	5				
85	55%	50+	85'-86.5'				2000+	SP	Dark gray poorly graded sand, moist, strong odor			10	60	25	5				
90	50%	50+	90'-91.5'				128	SM	Dark gray silty sand, moist, strong odor			10	60	30					
95	50%	50+	95'-96.5'				193.6	SP-SM	Gray poorly graded sand with silt, moist, hydrocarbon odor			10	40	40	10				
100	45%	50+	100'-101.5'				130.8	ML	Dark brown sandy silt, moist, hydrocarbon odor			5	40	55					
105	50%	50+	105'-106.5'	77.4	SP	Dark gray poorly graded sand, moist, hydrocarbon odor			10	25	40	20	5						
110	60%	8/25/28	110'-111.5'	84.6	SP	SAA, wet			15	20	55	10							
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High


NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	60%	8/25/28	110'-111.5'		84.6	SP	SAA, wet		15	20	55	10					
115	80%	13/19/42	115'-116.5'		345.0	SP	Dark gray poorly graded sand, wet, hydrocarbon odor	2	8	50	25	10	5				
120	75%	45/50+	120'-121.5'		83.5	ML	Brown sandy silt with red and orange mottling, wet, hydrocarbon odor, dark gray staining				5	35	60				
125	60%	13/15/32	125'-126.5'		6.1	ML	Dark gray sandy silt, wet, hydrocarbon odor				5	55	40				
130	60%	50+	130'-131.5'		6.7	ML	Olive brown sandy silt, wet, hydrocarbon odor	2	3	2	8	20	65				
135	70%	50+	133.5'-135'		11.2	SP-SM	Olive gray poorly graded sand with silt, wet, slight hydrocarbon odor		3	7	60	20	10				
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	1/11/2011
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	1/12/2011

Elevation	126.73	ft.	Datum	Boring Location	Hospital near MW-601A
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> Cutting Head
Hammer Type					<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
					<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
					<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Drilling Notes: Samples for visual-manual ID only					Total Depth
					130'

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							4" Asphalt Hand auger first 5 feet														
5	95%	10/10/2010	5'		0.2	ML	Brown sandy silt, dry, no odor						5	25	70						
10	90%	18/13/20	10'-11.5'		0.3		Light brown sandy silt, moist, no odor	2		3	5		20	70							
						SP-SM	13'-14' well graded sand with silt and gravels	2		13	20	35	20	10							
15	80%	23/31/31	15'-16.5'		0.6	ML	Light gray sandy silt, moist, no odor, rusty orange mottling						35	65							
20	65%	20/44/48	20'-21.5'		0.5	SM	Light grayish white silty sand, dry, no odor						80	20							

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core	Riser Pipe	Screen	Boring Depth (Linear ft.)	130'
			First Water	Stabilized Water						
					T	Thin Wall Tube	Filter Sand	Cuttings	Sample Method	Cal Mod Split Spoon
					U	Undisturbed Sample	Grout	Concrete	Number of Samples	
					S	Split Spoon Sample	Bentonite Seal			
					G	Geoprobe			BORING NO.	MW-708

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
20	65%	20/44/48	20'-21.5'			0.5	SM	Light grayish white silty sand, dry, no odor					80	20				
25	100%	15/24/42	25'-26.5'			16.7	SM	Olive gray silty sand, moist, slight odor, trace coarse and medium sand			2	3	65	30				
30	85%	16/27/40	30'-31.5'			8.6	SM	Gray silty sand, moist, slight odor, trace medium sand				3	77	20				
35	80%	22/31/50	35'-36.5'			16.8	SP-SM	Olive gray poorly graded sand with silt, moist, slight odor					90	10				
40	60%	33/50+	40'-41.5'			0.9	SP-SM	Greenish gray poorly graded sand with silt, moist, slight odor, trace coarse sand and fine subrounded gravel	2	3	5	80	10					
45	65%	20/50+	45'-46.5'			8.7	SP	Light gray poorly graded sand, moist, slight odor			5	70	20	5				
50	70%	33/50+	50'-51.5'			27.4	SM	Yellowish brown silty sand, moist, slight odor					85	15				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
50	70%	33/50+	50'-51.5'			27.4	SM	Yellowish brown silty sand, moist, slight odor					85	15				
55	75%	17/30/50	55'-56.5'			5.8	SP-SM	Olive gray poorly graded sand with silt, moist, no odor					90	10				
60	55%	50+	60'-61.5'			2.7	SP	Olive gray poorly graded sand					95	5				
65	60%	50+	65'-66.5'			2.5	SP-SM	Very light gray poorly graded sand with silt, moist, no odor	5	15	40	30	10					
70	65%	29/50+	70'-71.5'			3.0	SP-SM	Light gray poorly graded sand with silt, moist, slight odor					90	10				
75	50%	50+	75'-76.5'			56.4	SP-SM	Gray poorly graded sand with silt, moist, hydrocarbon odor	10	10	45	25	10					
80	40%	50+	80'-81.5'			38.2	SP-SM	Olive gray poorly graded sand with silt, moist, hydrocarbon odor					90	10				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine	Dilatancy		Toughness	Plasticity	Strength	
80	40%	50+	80'-81.5'				38.2	SP-SM	Olive gray, moist, hydrocarbon odor					90	10					
85	45%	50+	85'-86.5'				83.9	SP-SM	Olive gray poorly graded sand with silt, moist, strong odor	10	10	45	25	10						
90	50%	50+	90'-91.5'				133	SP-SM	SAA	5	15	40	30	10						
95	10%	50+	95'-96.5'				2255	SP-SM	Dark Gray poorly graded sand with silt, moist, strong hydrocarbon odor	3	12	45	30	10						
100	25%	50+	100'-101.5'				2375	SP	Dark gray poorly graded sand	3	2	10	50	30	5					
105	40%	30/50+	105'-106.5'				2325	ML/SM	First water at ~105 Dark gray sandy silt/silty sand, wet, strong hydrocarbon odor	2	3	10	10	25	50					
110	60%	50+	110'-111.5'				2309	SP-SM	Dark gray poorly graded sand with silt, wet, strong hydrocarbon odor, trace fine gravels	2	8	50	30	10						
										C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High


NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines		Dilatancy	Toughness	Plasticity	Strength
110	60%	50+	110'-111.5'		2309	SP-SM	Dark gray poorly graded sand with silt, wet, strong hydrocarbon odor, trace fine gravels		2	8	50	30	10					
115	85%	17/20/24	115'-116.5'		177	SP-SM	Dark gray poorly graded sand with silt, wet, hydrocarbon odor				5	85	10					
120	95%	20/50+	120'-121.5'		1769	SP-SM	Dark gray poorly graded sand with silt, wet, hydrocarbon odor		3	7	50	30	10					
125	90%	17/50+	125'-126.5'		1184	SP	Dark gray poorly graded sand, w/trace coarse and fine gravels		2	3	5	50	35	5				
130	95%	8/10/30	130'-131.5'		2207	SP	SAA, w/trace fine gravels		2	8	55	30	5					
135																		
140																		
								C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	1/24/2011
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	1/25/2011

Elevation	140.48	ft.	Datum	Boring Location	Hospital near MW-604
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> Cutting Head
				Hammer Type	<input type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input checked="" type="checkbox"/> Automatic
				Drilling Mud	<input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None
				Total Depth	130'
Drilling Notes: Samples for visual-manual ID only					

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							4" Asphalt Hand auger first 5 feet														
5	95%	9/14/2016	5'		1.2	ML	5YR 4/4 Reddish brown sandy silt, moist, no odor						5	20	75						
10	100%	11/12/13	10'-11.5'		2.1	SM	10YR 5/6 Yellowish brown silty sand with brown mottling, moist, no odor						85	15							
15	100%	13/27/38	15'-16.5'		1.3	SP-SM	10Y 6/2 Light brownish gray poorly graded sand with silt with orange and rusty mottling, moist, no odor						90	10							
20	80%	20/50+	20'-21.5'		<1.0	SP-SM	10YR 7/1 Light gray poorly graded sand with silt, moist, no odor						30	60	10						
								C	F	C	M	F	FS	D	T	P	S				

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.)	130'
			First Water	Stabilized Water						
					T	Thin Wall Tube		Screen	Sample Method	Cal Mod Split Spoon
					U	Undisturbed Sample		Filter Sand	Number of Samples	
					S	Split Spoon Sample		Cuttings		
					G	Geoprobe		Grout		
								Concrete		
								Bentonite Seal		
									BORING NO.	MW-709

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
20	80%	20/50+	20'-21.5'			<1.0	SP-SM	10YR 7/1 Light gray, moist, no odor				30	60	10				
25	75%	25/50+	25'-26.5'			<1.0	SP-SM	SAA			5	45	40	10				
30	0%	35/50+	30'-31.5'			NA		No Recovery										
35	80%	15/50+	35'-36.5'			<1.0	SP-SM	10YR 6/2 Light brownish gray poorly graded sand with silt with trace fine gravels, moist, no odor	3	7	35	45	10					
40	90%	20/30/38	40'-41.5'			<1.0	SP-SM	5Y 7/2 Light gray poorly graded sand with silt, moist, no odor	10	15	35	30	10					
45	85%	18/26/30	45'-46.5'			<1.0	SW	5Y 7/1 Light gray well graded sand with gravels, moist, no odor	5	10	20	30	30	5				
50	70%	28/50+	50'-51.5'			1.5	SP-SM	5Y 7/4 Pale yellow poorly graded sand with silt with brown mottling, moist, no odor	5	10	45	30	10					
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
50	70%	28/50+	50'-51.5'			1.5	SP-SM	5Y 7/4 Pale yellow poorly graded sand with silt with brown mottling, moist, no odor		5	10	45	30	10				
55	70%	25/50+	55'-56.5'			7.5	SP	10YR 6/6 Brownish yellow poorly graded sand with trace fine gravel, moist, no odor		3	7	25	60	5				
60	85%	50+	60'-61.5'			13.3	SP-SM	2.5Y 7/3 Pale yellow poorly graded sand with silt, moist, slight odor			5	25	60	10				
65	75%	50+	65'-66.5'			19.9	SP-SM	2.5Y 6/4 Light yellowish brown poorly graded sand with silt, moist, slight odor			5	40	45	10				
70	100%	25/30/42	70'-71.5'			21.3	SM	Gley1 5/5G Dark greenish gray silty sand, moist, slight odor			3	7	75	15				
75	95%	23/30/50+	75'-76.5'			27.3	SP-SM	Gley1 4/10GY Dark greenish gray poorly graded sand with silt, moist, slight odor				5	85	10				
80	15%	50+	80'-81.5'			7.1	SP-SM	Gley1 6/10BG Greenish gray poorly graded sand with silt, moist, slight odor			10	35	45	10				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
80	15%	50+	80'-81.5'				7.1	SP-SM	Gley1 6/10BG Greenish gray, moist, slight odor			10	35	45	10				
85	70%	50+	85'-86.5'				2.8	SP	Gley1 4/5B Dark bluish gray poorly graded sand, moist, slight odor				10	85	5				
90	20%	50+	90'-91.5'				3.6	SP	Gley 7/5B Light bluish gray poorly graded sand, moist, slight odor	5	15	25	50	5					
95	90%	50+	95'-96.5'				4.3	SP	Gley 6/10Y Greenish gray poorly graded sand, moist, slight odor	3	7	25	60	5					
100	80%	50+	100'-101.5'				3.1	SP	Gley 5/5G Greenish gray poorly graded sand, moist, slight odor	5	10	15	25	40	5				
105	90%	15/31/50	105'-106.5'				4.3	SP	Dark greenish gray poorly graded sand, moist, slight odor					90	10				
110	45%	50+	110'-111.5'				60.5	SP	Gley 4/10BG Dark greenish gray poorly graded sand, moist, mild odor			10	85	5					
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High



NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	45%	50+	110'-111.5'		60.5	SP	Gley 4/10BG Dark greenish gray poorly graded sand, moist, mild odor					85	10				
115	100%	15/30/50+	115'-116.5'		104	ML	Gley 5/5BG Greenish gray sandy silt, wet, moderate to strong odor				5	20	75				
120	95%	13/32/50	120'-121.5'		67.2	SP-SM	Gley 4/5BG Dark greenish gray poorly graded sand with silt, wet, moderate odor					90	10				
125	70%	17/50+	125'-126.5'		42.2	SP	Gley 4/10GY Dark greenish gray poorly graded sand, wet, moderate odor			10	60	25	5				
130	80%	12/23/37	130'-131.5'		17.1	SP-SM	Gley 4/5B Dark bluish gray poorly graded sand with silt, wet, slight odor			10	50	30	10				
135																	
140																	
									C	F	C	M	F	FS	D	T	P

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	1/12/2011
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	1/13/2011

Elevation	122.15	ft.	Datum	Boring Location	Hospital near MW-603
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> Cutting Head
Hammer Type					<input type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input checked="" type="checkbox"/> Automatic
Drilling Mud					<input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None
Total Depth					130'
Drilling Notes: Samples for visual-manual ID only					

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							4" Asphalt Hand auger first 5 feet														
5	30%	50+	5'		0.0	ML	Dark brown sandy silt, dry, no odor				5	25	70								
10	80%	11/27/39	10'-11.5'		0.0	ML	Brown sandy silt, moist, no odor				5	15	80								
15	95%	30/40/50	15'-16.5'		0.0	SP-SM	Light gray poorly graded sand with silt, moist, no odor				3	7	80	10							
20	95%	27/29/40	20'-21.5'		0.0	ML	Greenish gray sandy silt, moist, no odor						20	80							
								C	F	C	M	F	FS	D	T	P	S				

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core	Riser Pipe	Screen	Boring Depth (Linear ft.)	130'
			First Water	Stabilized Water						
					T	Thin Wall Tube	Filter Sand	Cuttings	Sample Method	Cal Mod Split Spoon
					U	Undisturbed Sample	Grout	Concrete	Number of Samples	
					S	Split Spoon Sample	Bentonite Seal			
					G	Geoprobe				
									BORING NO.	MW-710

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
										% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
20	95%	27/29/40	20'-21.5'				0.0	ML	Greenish gray sandy silt, moist, no odor					20	80				
25	90%	20/30/38	25'-26.5'				0.0	SM	Light brown silty sand with brown mottling, moist, no odor				5	75	20				
30	80%	13/18/33	30'-31.5'				0.0	SP-SM	Yellowish gray poorly graded sand with silt, moist, no odor				3	87	10				
35	65%	21/32/50	35'-36.5'				0.0	SP	Light gray poorly graded sand, moist, no odor				3	7	85	5			
40	50%	22/29/40	40'-41.5'				0.0	SP	SAA				5	80	5				
45	45%	28/35/43	45'-46.5'				0.0	SP	Very light gray poorly graded sand, moist, no odor				5	20	70	5			
50	55%	23/38/50	50'-51.5'				0.0	SW-SM	Two 1-inch bands of rust color staining normal to core apx 3 inch apart at 49' bgs Light gray well graded sand with silt, moist, no odor				20	40	30	10			
Field Tests										Dilatancy:	R - Rapid S - Slow N - None			Plasticity: N - Nonplastic L - Low M - Medium H - High					
										Toughness:	L - Low M - Medium H - High			Dry Strength: N - None L - Low M - Medium H - High V - Very High					
NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.																			
NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"																			

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
50	55%	23/38/50	50'-51.5'			0.0	SW-SM	Light gray well graded sand, moist, no odor			20	40	30	10				
55	70%	18/27/43	55'-56.5'			0.0	SW	Brownish gray well graded sand, moist, no odor	5	30	40	20	5					
60	90%	28/42/50	60'-61.5'			0.0	SP	Light yellowish gray poorly graded sand, moist, no odor		5	20	70	5					
65	80%	18/50+	65'-66.5'			0.0	SP-SM	Light gray poorly graded sand with silt, moist, no odor			15	75	10					
70	100%	32/50+	70'-71.5'			0.0	ML	Dark gray silt with sand, moist, no odor					15	85				
75	85%	12/39/50+	75'-76.5'			0.0	SP-SM	Light gray poorly graded sand with silt, moist, no odor			5	85	10					
80	80%	26/50+	80'-81.5'			0.0	SP	Light yellowish brown poorly graded sand, moist, no odor	5	10	60	20	5					
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

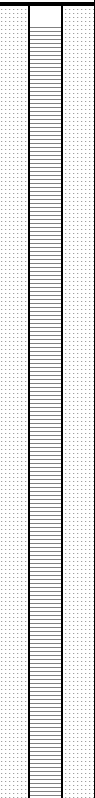
NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	80%	26/50+	80'-81.5'				0.0	SP	Light yellowish brown poorly graded sand, moist, no odor		5	10	60	20	5				
85	60%	28/50+	85'-86.5'				0.0	SP-SM	Light yellowish brown poorly graded sand with silt, moist, no odor				60	30	10				
90	45%	50+	90'-91.5'				0.0	SP-SM	Greenish gray poorly graded sand with silt, moist, no odor			10	60	20	10				
95	15%	50+	95'-96.5'				0.0	SP-SM	Light gray poorly graded sand with silt, moist, no odor			2	68	20	10				
100	95%	35/50+	100'-101.5'				1.2	ML	Olive brown sandy silt, moist, no odor						20	80			
105	90%	15/50+	105'-106.5'			1.1	SM/ML	Greenish brown sandy silt/silty sand, wet, no odot			10	5	35	50					
110	95%	20/23/27	110'-111.5'			2.4	SP	Gray poorly graded sand, wet, no odor					25	70	5				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.


NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	90%	20/23/27	110'-111.5'		2.4	SP	Gray poorly graded sand, wet, no odor				25	70	5				
115	85%	21/50+	115'-116.5'		2	SM	Olive gray silty sand, wet, no odor				15	70	15				
120	100%	25/50+	120'-121.5'		2.7	ML	Olive gray silt with sand, wet, no odor					25	75				
125	90%	6/12/30	125'-126.5'		2.2	SP	Gray poorly graded sand with gravels, wet, no odor	10	10	25	40	10	5				
130	65%	8/10/50	130'-131.5'		1.9	SP	Light gray poorly graded sand with gravels, wet, no odor	10	10	15	50	10	5				
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sasic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	1/14/2011
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	1/17/2011

Elevation	128.09	ft.	Datum	Boring Location	Hospital ~500' east of MW-710
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod <input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input type="checkbox"/> Winch	<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track <input type="checkbox"/> Roller Bit	<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger <input checked="" type="checkbox"/> Cutting Head	Drilling Notes: Samples for visual-manual ID only

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							4" Asphalt Hand auger first 5 feet														
5	100%	15/18/21	5'		0.0	ML	Light brown silt with sand, moist, no odor						20	80							
10	55%	20/50+	10'-11.5'		0.0	SM/ML	Light brown silty sand/sandy silt with orange mottling, moist, no odor			3	7	40	50								
15	100%	18/23/26	15'-16.5'		0.0	SM	Yellowish brown silty sand, moist, no odor	3	3			54	40								
20	95%	16/25/29	20'-21.5'		0.0	ML	Grayish brown sandy silt, moist, no odor			5	5	20	70								

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.) Sample Method Number of Samples	132' Cal Mod Split Spoon
			First Water	Stabilized Water						
					T	Thin Wall Tube		Filter Sand		
					U	Undisturbed Sample		Cuttings		
					S	Split Spoon Sample		Grout		
					G	Geoprobe		Concrete		
								Bentonite Seal		
									BORING NO.	MW-711

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
20	95%	16/25/29	20'-21.5'			0.0	ML	Grayish brown sandy silt, moist, no odor			5	5	20	70				
25	95%	16/18/23	25'-26.5'			0.0	ML	Yellowish brown sandy silt with orange and gray mottling, moist, no odor				5	35	60				
30	100%	26/37/50+	30'-31.5'			0.0	SM	Greenish gray silty sand with orange-yellow mottling, moist, no odor			5	5	60	30				
35	95%	11/14/18	35'-36.5'			0.0	ML	Greenish gray sandy silt with light gray mottling, moist, no odor				10	30	60				
40	100%	13/26/42	40'-41.5'			1.0	SM	Light gray with rusty mottling silty sand, moist, no odor				5	80	15				
45	95%	45/25/50	45'-46.5'			0.0	SM	Olive gray silty sand, moist, no odor					85	15				
50	50%	35/50+	50'-51.5'			0.8	SP-SM	Yellowish gray poorly graded sand with silt, moist, no odor		5	25	40	20	10				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	Dilatancy		Toughness	Plasticity	Strength	
50	50%	35/50+	50'-51.5'			0.8	SP-SM	Yellowish gray poorly graded sand with silt, moist, no odor		5	25	40	20	10					
55	65%	30/50+	55'-56.5'			0.0	SP-SM	Very light gray poorly graded sand with silt, moist, no odor		5	25	40	20	10					
60	80%	35/50+	60'-61.5'			0.0	SP	Yellowish gray poorly graded sand with gravels, moist, no odor	15	5	10	25	40	5					
65	15%	17/23/50	65'-66.5'			1.2	ML	Greenish gray sandy silt, moist, no odor				20	10	70					
70	100%	27/50+	70'-71.5'			11	ML	Light gray silt with sand with orange mottling and rusty staining normal to core, moist, no odor			10	5	10	75					
75	60%	50+	75'-76.5'			113	SP	Light gray poorly graded sand, moist, strong odor			10	75	10	5					
80	50%	50+	80'-81.5'			5.4	SP-SM	Greenish gray poorly graded sand with silt, moist, slight odor			5	25	60	10					
									C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine	Dilatancy		Toughness	Plasticity	Strength	
80	50%	50+	80'-81.5'				5.4	SP-SM	Greenish gray poorly graded sand with silt, moist, slight odor			5	25	60	10					
85	70%	20/33/47	85'-86.5'				7.6	SP	Greenish gray poorly graded sand, moist, slight odor			5	50	40	5					
90	85%	50+	90'-91.5'				13.8	SP	Light gray poorly graded sand, moist, odor			5	55	35	5					
95	90%	25/50+	95'-96.5'				270	ML	Dark olive gray sandy silt, moist, strong odor				5	25	70					
100	65%	25/50+	100'-101.5'				4398	SP	Light gray poorly graded sand, moist, strong odor				50	40	10					
105	100%	9/15/18	105'-106.5'				40	ML	Light olive brown silt with sand, moist, odor		3	7	5	10	75					
110	100%	15/23/33	110'-111.5'				33	ML	Light gray silt with sand, very moist, odor					20	80					
										C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High



NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
110	100%	15/23/33	110'-111.5'		33	ML	Light gray silt with sand, very moist, odor					20	80				
								First water encountered at ~112' bgs									
115	90%	7/17/40	115'-116.5'		107	SP	Gray poorly graded sand, wet, strong odor	5	5	5	50	30	5				
120	90%	13/19/21	120'-121.5'		1249	SP-SM	Dark gray poorly graded sand with silt, wet, strong odor		5	10	50	25	10				
125	95%	5/15/20	125'-126.5'		197	SP-SM	Olive gray poorly graded sand with silt, wet, strong odor			5	60	25	10				
130	95%	7/10/16	130'-131.5'		243	SP-SM	SAA				60	30	10				
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

MW-712

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PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sasic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	1/21/2011
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	1/24/2011

Elevation	123.57	ft.	Datum	Boring Location	Hospital ~200' southeast of MW-711
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> Cutting Head
Hammer Type					<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
					<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
					<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Drilling Notes:					Samples for visual-manual ID only

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							4" Asphalt Hand auger first 5 feet														
5	95%	4/4/2009	5'		0.0	SM	Light brown silty sand, moist, no odor							20	50	30					
10	90%	17/50+	10'-11.5'		0.0	SM	Yellowish brown silty sand, moist, no odor							5	70	25					
15	100%	23/30/35	15'-16.5'		0.0	SP-SM	Light brown poorly graded sand with silt, moist, no odor							70	20	10					
20	95%	8/17/31	20'-21.5'		0.0	SP-SM	Yellowish brown poorly graded sand with silt, moist, no odor							3	62	25	10				

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.) 135'	
			First Water	Stabilized Water	T	Thin Wall Tube		Screen		
					U	Undisturbed Sample		Filter Sand	Sample Method Cal Mod Split Spoon	
					S	Split Spoon Sample		Cuttings		
					G	Geoprobe		Grout	Number of Samples	
								Concrete		
								Bentonite Seal	BORING NO. MW-712	

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
20	95%	8/17/31	20'-21.5'			0.0	SP-SM	Yellowish brown poorly graded sand with silt, moist, no odor			3	62	25	10				
25	100%	19/27/38	25'-26.5'			0.0	ML	Olive gray silt with rust colored and light gray mottling, moist, no odor	3	7			10	80				
30	100%	36/50+	30'-31.5'			0.0	ML	Olive gray silt with sand light gray mottling, moist, no odor	5		5	5	10	75				
35	100%	17/23/37	35'-36.5'			0.0	SP-SM	Light gray poorly graded sand with silt with redish brown mottling, moist, no odor				5	85	10				
40	95%	18/20/35	40'-41.5'			0.0	SP-SM	Orange brown poorly graded sand with silt, moist, no odor					90	10				
45	70%	28/50+	45'-46.5'			0.0	SP-SM	Green brown poorly graded sand with silt, moist, no odor			3	12	75	10				
50	40%	50+	50'-51.5'			0.0	SP	Yellowish-gray-brown poorly graded sand, moist, no odor			10	60	25	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-712

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
50	40%	50+	50'-51.5'			0.0	SP	Yellowish-gray-brown poorly graded sand, moist, no odor			10	60	25	5				
55	85%	50+	55'-56.5'			1.8	ML	Greenish gray silt with sand, moist, no odor					15	85				
60	80%	12/26/42	60'-61.5'			0.0	SP	Orange brown poorly graded sand, moist, no odor				5	90	5				
65	90%	13/27/40	65'-66.5'			8.2	SM	Brownish gray silty sand with rusty colored mottling, moist, slight odor		5			75	20				
70	65%	50+	70'-71.5'			4.3	SP-SM	Yellowish gray poorly graded sand with silt with orange hues, moist, slight odor				40	50	10				
75	80%	23/50+	75'-76.5'			45.3	SP-SM	Light gray poorly graded sand with silt, moist, odor					90	10				
80	70%	50+	80'-81.5'			2.8	SP	Light gray poorly graded sand, moist, slight odor				25	70	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High








NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-712

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	70%	50+	80'-81.5'			2.8	SP	Light gray poorly graded sand, moist, slight odor				25	70	5				
85	65%	50+	85'-86.5'			4.5	SP	Greenish gray poorly graded sand, moist, slight odor				10	85	5				
90	55%	17/50+	90'-91.5'			4.0	SP	Gray poorly graded sand, moist, slight odor			5	20	70	5				
95	85%	50+	95'-96.5'			26.8	SP-SM	Olive gray poorly graded sand with silt, moist, slight odor				5	85	10				
100	60%	28/50+	100'-101.5'			128		Greenish gray, moist, strong odor										
								First water at ~ 105' bgs										
105	55%	50+	105'-106.5'			1901	SP-SM	Greenish gray poorly graded sand with silt, wet, strong odor	2	8	10	50	20	10				
110	85%	15/50+	110'-111.5'			1950	SP-SM	Dark gray poorly graded sand with silt and gravels, wet, strong odor, subangular to subrounded gravels	5	10	10	50	20	5				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.


NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	85%	15/50+	110'-111.5'		1950	SP-SM	Dark gray poorly graded sand with silt and gravels, wet, strong odor, subangular to subrounded gravels	5	10	10	50	20	5				
					2379		SAA	5	10	10	50	20	5				
115	100%	28/32/50+	115'-116.5'		28.6	ML	Light brown sandy silt with gray mottling, moist, odor				5	15	80				
					2214	SP-SM	Dark gray poorly graded sand with silt, wet, strong odor	5		15	50	20	10				
120	95%	50+	120'-121.5'		46.2	ML	Light grown silt with sand, wet, odor		5	3	7	10	75				
125	95%	50+	125'-126.5'		36.9	ML	Greenish brown silt, wet, odor	5	5	5			85				
130	95%	13/50+	130'-131.5'		1368	SP-SM	Dark gray poorly graded sand with silt, wet, strong odor				25	65	10				
135	10%	50+			1503.0	SM	Dark gray silty sand, wet strong odor				5	80	15				
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None

Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High

Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

MW-713

Page 1 of 5

PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	1/18/2011
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	1/19/2011

Elevation	128.42	ft.	Datum	Boring Location Hospital ~200' east of MW-712											
Item	Casing		Sampler	Core Barrel	Rig Make & Model			CME 95		Hammer Type		Drilling Mud		Total Depth	
Type	CFA		S	NA	<input checked="" type="checkbox"/> Truck	<input type="checkbox"/>	Tripod	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/>	Safety	<input type="checkbox"/>	Bentonite	133'	
Inside Diameter (in.)	5-3/4"		2"	NA	<input checked="" type="checkbox"/> ATV	<input type="checkbox"/>	Geoprobe	<input type="checkbox"/>	<input type="checkbox"/> Winch	<input type="checkbox"/>	<input type="checkbox"/> Doughnut	<input type="checkbox"/>	Polymer		
Hammer Weight (lb.)	NA		140		<input type="checkbox"/> Track	<input type="checkbox"/>	Air Track	<input type="checkbox"/>	<input type="checkbox"/> Roller Bit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Automatic	<input checked="" type="checkbox"/>	None		
Hammer Fall (in.)	NA		30		<input type="checkbox"/> Skid	<input type="checkbox"/>	Hand Auger	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Cutting Head	Drilling Notes: Samples for visual-manual ID only					

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength				
0							4" Asphalt Hand auger first 5 feet														
5	100%	10/13/2020	5'		0.0	ML	Dark brown silt with sand, moist, no odor						15	85							
10	95%	19/25/30	10'-11.5'		0.0	SM	Greenish gray silty sand with rusty orange mottling, moist, no odor			5	60	35									
15	100%	20/20/30	15'-16.5'		0.0	ML	Light olive gray sandy silt, moist, no odor			5	5	30	60								
20	100%	15/20/23	20'-21.5'		0.0	SM	Light brown silty sand with rust colored mottling, moist, no odor				5	80	15								
								C	F	C	M	F	FS	D	T	P	S				

Water Level Data					Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:		CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.)	133'
			First Water	Stabilized Water						
					T	Thin Wall Tube		Screen	Sample Method	Cal Mod Split Spoon
					U	Undisturbed Sample		Filter Sand	Number of Samples	
					S	Split Spoon Sample		Cuttings		
					G	Geoprobe		Grout		
								Concrete		
								Bentonite Seal		
									BORING NO.	MW-713

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

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Page 2 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
20	100%	15/20/23	20'-21.5'				0.0	SM	Light brown silty sand with rust colored mottling, moist, no odor				5	80	15				
25	20%	50+	25'-26.5'				0.0	SP	Yellowish orange poorly graded sand, moist, no odor		5	10	55	25	5				
30	70%	7/33/50+	30'-31.5'				1.5	SP	Light gray poorly graded sand, moist, no odor			15	50	30	5				
35	65%	25/35/50+	35'-36.5'				0.0	SP	Yellowish brown poorly graded sand, moist, no odor			10	50	35	5				
40	50%	20/50+	40'-41.5'				1.5	SP	Light gray poorly graded sand, moist, no odor		5	15	50	25	5				
45	100%	27/50+	45'-46.5'				0.0	SP-SM	Greenish brown poorly graded sand with silt, moist, no odor					90	10				
50	55%	50+	50'-51.5'				0.0	SP	Light gray poorly graded sand, moist, no odor				20	75	5				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-713

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
									% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
50	55%	50+	50'-51.5'			0.0	SP	Light gray poorly graded sand, moist, no odor				20	75	5				
55	85%	33/50+	55'-56.5'			0.0	SP	Light gray poorly graded sand, moist, no odor			5	55	35	5				
60	100%	10/12/20	60'-61.5'			1.2	ML	Light brown silt with sand with orange mottling, moist, no odor					15	85				
65	95%	20/50+	65'-66.5'			0.0	ML	Greenish brown silt with sand with orange mottling, moist, no odor					25	75				
70	70%	20/50+	70'-71.5'			0.0	SP	Yellowish brown poorly graded sand, moist, no odor				60	35	5				
75	85%	20/39/50+	75'-76.5'			0.0	SP-SM	Olive gray poorly graded sand with silt, moist, no odor				10	80	10				
80	75%	49/50+	80'-81.5'			1.2	SP-SM	Light olive gray poorly graded sand with silt, moist, no odor					90	10				
									C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

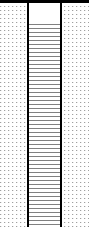
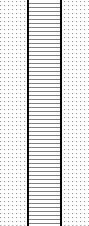
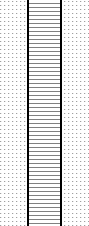
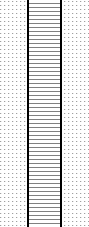
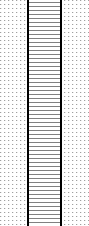
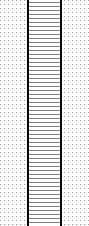

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-713

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
80	75%	49/50+	80'-81.5'				1.2	SP-SM	Light olive gray poorly graded sand with silt, moist, no odor					90	10				
85	70%	25/50+	85'-86.5'				1.7	SP-SM	Greenish gray poorly grded sand with silt, moist, no odor					90	10				
90	60%	25/50+	90'-91.5'				2.8	SP	Dark gray poorly graded sand, moist, slight odor		5	10	55	25	5				
95	55%	17/27/33	95'-96.5'				1.7	SP	Dark gray poorly graded sand, moist, slight odor				50	40	10				
100	75%	23/50+	100'-101.5'				5.1	SP-SM	Dark gray poorly graded sand with silt, moist, slight odor				10	80	10				
105	100%	13/30/50+	105'-106.5'				91.9	SM	Dark gray silty sand with orange mottling, moist, odor				5	55	40				
110	25%	12/25/53	110'-111.5'				134	SP-SM	Dark gray poorly graded sand with silt, wet, strong odor First water at ~110' bgs				30	60	10				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High


NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-713

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Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	25%	12/25/53	110'-111.5'		134	SP-SM	Dark gray poorl graded sand with silt, wet, strong odor			30	60	10					
115	90%	14/50+	115'-116.5'		113	SP-SM	Dark gray poorly graded sand with silt, wet, strong odor			5	60	25	10				
120	70%	7/13/17	120'-121.5'		107	SP-SM	SAA			5	65	20	10				
125	80%	8/12/15	125'-126.5'		92	SP	Dark gray poorly graded sand, wet, strong odor			5	70	20	5				
130	75%	10/15/19	130'-131.5'		94	SP	SAA	3	7	65	20	5					
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"



BORING LOG

BORING NO.

MW-714

Page 1 of 5

PROJECT	Well Installation	MEI FILE NO.	1003-001-200
LOCATION	12345 Lakeland Rd, Santa Fe Springs, CA	PROJECT MGR.	Jeremy Squire
CLIENT	Lakeland Development Corp.	FIELD REP.	Frane Sosic
CONTRACTOR	WDC, Montclair, CA	DATE STARTED	1/19/2011
DRILLER	Lead driller: Earnie; Helpers: Ricardo, Bobby	DATE FINISHED	1/20/2011

Elevation	129.07	ft.	Datum	Boring Location	Hospital near MW-607
Item	Casing	Sampler	Core Barrel	Rig Make & Model	CME 95
Type	CFA	S	NA	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod <input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety <input type="checkbox"/> Bentonite
Inside Diameter (in.)	5-3/4"	2"	NA	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input type="checkbox"/> Winch	<input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer
Hammer Weight (lb.)	NA	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track <input type="checkbox"/> Roller Bit	<input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Hammer Fall (in.)	NA	30		<input type="checkbox"/> Skid <input type="checkbox"/> Hand Auger <input checked="" type="checkbox"/> Cutting Head	Drilling Notes: Samples for visual-manual ID only

Depth (ft.)	Recovery %	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test						
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength		
0							4" Asphalt Hand auger first 5 feet												
5	100%	16/50+	5'		0.0	SM/ML	Yellowish brown silty sand/sandy silt, moist, no odor, tree roots				10	40	50						
10	75%	5/8/11	10'-11.5'		0.0	SM	Yellowish brown silty sand with rust and brown mottling, moist, no odor				25	50	25						
15	60%	8/12/18	15'-16.5'		0.0	SM	Yellowish brown silty sand, moist, no odor				15	65	20						
20	85%	15/30/33	20'-21.5'		0.0	SP-SM	Yellowish brown poorly graded sand with silt, moist, no odor		5	15	50	20	10						
								C	F	C	M	F	FS	D	T	P			

Water Level Data				Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:	CC	Cont. Core		Riser Pipe	Boring Depth (Linear ft.) 143'	
			First Water	T	Thin Wall Tube		Screen		
			Stabilized Water	U	Undisturbed Sample		Filter Sand	Sample Method Cal Mod Split Spoon	
				S	Split Spoon Sample		Cuttings		
				G	Geoprobe		Grout	Number of Samples	
							Concrete		
							Bentonite Seal	BORING NO. MW-714	

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

MW-714

Page 2 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				% Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	Dilatancy		Toughness	Plasticity	Strength	
20	85%	15/30/33	20'-21.5'			0.0	SP-SM	Yellowish brown poorly graded sand with silt, moist, no odor		5	15	50	20	10					
25	70%	17/20/37	25'-26.5'			0.0	SP-SM	SAA			10	30	50	10					
30	80%	20/29/31	30'-31.5'			0.0	SP	Yellowish brown poorly graded sand, moist, no odor			5	35	55	5					
35	15%	15/50+	35'-36.5'			0.0	SW-SM	Light gray well graded sand with silt and gravels, moist, no odor	3	12	25	30	20	10					
40	85%	25/50+	40'-41.5'			0.0	GP	Olive gray poorly graded gravel with sand, moist, no odor	25	40	15	10	5	5					
45	10%	50+	45'-46.5'			0.0	SP	Yellowish gray poorly graded sand, moist, no odor			5	35	55	5					
50	90%	25/35/40	50'-51.5'			0.0	SP	Yellowish gray poorly graded sand, moist, no odor			20	75	5						
									C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-714

Page 3 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
50	90%	25/35/40	50'-51.5'				0.0	SP	Yellowish gray poorly graded sand, moist, no odor				20	75	5				
55	85%	7/50+	55'-56.5'				0.0	SP-SM	Reddish brown poorly graded sand with silt, moist, no odor				25	65	10				
60	60%	17/31/40	60'-61.5'				0.0	SP-SM	Light brown poorly graded sand with silt with yellow-orange hues, moist, no odor	5	10	50	25	10					
65	80%	30/50+	65'-66.5'				0.0	SW-SM	Light brown well graded sand with silt and gravels, moist, no odor	20	20	30	20	10					
70	90%	23/29/40	70'-71.5'				977	ML	Dark gray silt with sand, moist, strong odor, visible staining					25	75				
75	95%	23/30/41	75'-76.5'				2.3	SP-SM	Olive gray poorly graded sand with silt, moist, slight odor					90	10				
80	90%	28/50+	80'-81.5'				231	SP-SM	Greenish gray poorly graded sand with silt, moist, strong odor				15	75	10				
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-714

Page 4 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram			PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			% Fines	Field Test			
										% Coarse	% Fine	% Coarse	% Medium	% Fine		Dilatancy	Toughness	Plasticity	Strength
80	90%	28/50+	80'-81.5'				231	SP-SM	Greenish gray poorly graded sand with silt, moist, strong odor				15	75	10				
85	80%	35/50+	85'-86.5'				1.8	SP-SM	SAA				10	80	10				
90	95%	15/50+	90'-91.5'				196	ML	Olive gray silt with sand, moist, odor					25	75				
95	90%	30/43/50+	95'-96.5'				2.1	SP-SM	Dark gray poorly graded sand with silt, moist, slight odor					90	10				
100	90%	15/50+	100'-101.5'				100	SP-SM	Dark gray poorly graded sand with silt, moist, odor				15	75	10				
105	5%	31/50+	105'-106.5'				18.5	SM	Gray silty sand, moist, slight odor			5	15	60	20				
110	75%	24/50+	110'-111.5'				21	SP-SM	Greenish gray poorly graded sand with silt, moist, slight odor	3	7	40	40	10					
										C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.


NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

MW-714

Page 5 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	75%	24/50+	110'-111.5'		21	SP-SM	Greenish gray poorly graded sand with silt, moist, slight odor		3	7	40	40	10				
115	80%	50+	115'-116.5'		505	SP-SM	Gray poorly graded sand with silt, wet, strong odor First water at ~115' bgs				40	50	10				
120	95%	25/50+	120'-121.5'		304	ML	Gray silty sand, wet, strong odor				35	50	15				
125	95%	15/50+	125'-126.5'		393	SM	Very light gray silty sand, wet, strong odor					70	30				
130	45%	50+	130'-131.5'		381	SM	Dark olive gray silty sand, wet, strong odor				5	75	20				
135	100%	11/30/50+			128	SM	Dark gray silty sand, wet, strong odor				5	80	15				
140	85%	11/20/50+			229	SM	SAA				25	60	15				
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

MW-715

Page 2 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram		PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Fines	Field Test			
									% Coarse	% Fine	% Coarse	% Medium	% Fine	Dilatancy		Toughness	Plasticity	Strength	
20	95%	20/25/27	20'-21.5'			0.0	SP	10YR 6/4 brownish yellow poorly graded sand, moist, no odor				5	90	5					
							ML	2.5YR 5/4 reddish brown silt with sand, moist, no odor			10	10	5	75					
25	75%	15/30/30	25'-26.5'			0.0	SP	5YR 6/2 pinkish gray poorly graded sand, moist, no odor		5	15	25	50	5					
30	10%	10/50+	30'-31.5'			0.0	SP	SAA											
35	85%	25/50+	35'-36.5'			0.0	SP	10YR 6/1 gray poorly graded sand, moist, no odor			10	25	60	5					
40	100%	50/18/21	40'-41.5'			0.0	ML	2.5Y 5/1 gray silt with sand, moist, no odor	5	5	5	5		80					
45	100%	22/22/23	45'-46.5'			0.0	SP-SM	5Y 4/3 olive poorly graded sand with silt, moist, no odor				10	80	10					
50	100%	23/28/30	50'-51.5'			0.0	SM	5Y 4/1 dark gray silty sand with rusty-brown mottling, moist, no odor				15	70	15					
									C	F	C	M	F	FS	D	T	P	S	

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-715

Page 3 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID (PPM)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand		Fines		Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
50	100%	23/28/30	50'-51.5'		0.0	SM	5Y 4/1 dark gray silty sand with rusty-brown mottling, moist, no odor				15	70	15				
55	50%	50+	55'-56.5'		0.0	SP	5Y 6/4 pale olive poorly graded sand, moist, no odor				5	90	5				
60	60%	50+	60'-61.5'		0.0	SP	5Y 7/2 light gray poorly graded sand, moist, slight odor			5	25	65	5				
65	95%	24/26/34	65'-66.5'		0.0	SP-SM	2.5Y 4/4 olive brown poorly graded sand with silt with brown and gray mottling, moist, slight odor				10	80	10				
70	100%	20/28/30	70'-71.5'		4.3	ML	10YR 4/4 dark yellowish brown sandy silt with gray mottling, very moist, slight odor				10	20	70				
							Water encountered at ~70' - 75' bgs										
75	95%	10/19/35	75'-76.5'		1.2	ML	7.5YR 4/6 strong brown silt with sand, wet, no odor				10	90	S	M	M	V	
80	85%	50+	80'-81.5'		1.2	SP-SM	10YR 6/4 light yellowish brown poorly graded sand with silt, wet, no odor				55	35	10				
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.








NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.

MW-715

Page 4 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
80	85%	50+	80'-81.5'		1.2	SP-SM	10YR 6/4 light yellowish brown poorly graded sand with silt, wet, no odor				55	35	10				
85	100%	20/27/35	85'-86.5'		0.0	SM	2.5Y 5/4 light olive brown silty sand, very moist, no odor					75	25				
90	70%	50+	90'-91.5'		0.0	SP-SM	2.5Y 4/4 olive brown poorly graded sand with silt, very moist, no odor					90	10				
95	15%	50+	95'-96.5'		1.2	SP	2.5Y 6/6 olive yellow poorly graded sand, moist, slight odor			5	65	25	5				
100	15%	50+	100'-101.5'		1.5	SP	5Y 7/1 light gray poorly graded sand, moist, no odor				5	90	5				
105	90%	15/50+	105'-106.5'		12.2	SP	2.5Y 5/1 gray poorly graded sand, wet, slight odor				25	70	5				
110	100%	15/50+	110'-111.5'		79.2	SP	SAA, w/ more obvious odor Groundwater encountered at ~ 110' bgs			5	20	70	5				
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High


NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

BORING LOG

BORING NO.
MW-715

Page 5 of 5

Depth (ft.)	Recovery (%)	Blow Counts	Sample Depth (ft.)	Well Diagram	PID	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand				Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
110	100%	15/50+	110'-111.5'		79.2	SP	SAA, w/ more obvious odor			5	20	70	5				
115	95%	20/50+	115'-116.5'		74.5	SP	2.5Y 5/1 gray poorly graded sand, wet, moderate odor	5	5	15	50	20	5				
120	90%	8/21/50+	120'-121.5'		58	SP-SM	10YR 5/1 gray poorly graded sand with silt, wet, moderate odor			5	60	25	10				
125	100%	10/18/20	125'-126.5'		53.2	SP	10YR 5/1 gray poorly graded sand, wet, moderate odor	5	15	60	15	5					
130	90%	11/16/25	130'-131.5'		91.6	SP	SAA			5	65	25	5				
135																	
140																	
								C	F	C	M	F	FS	D	T	P	S

Field Tests

Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High

Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on ASTM Method D2248 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"

Appendix D

ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/22/2009 @ 8:41:01 AM

ROST Unit: 1

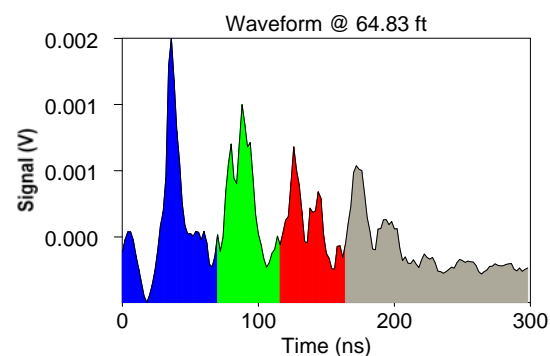
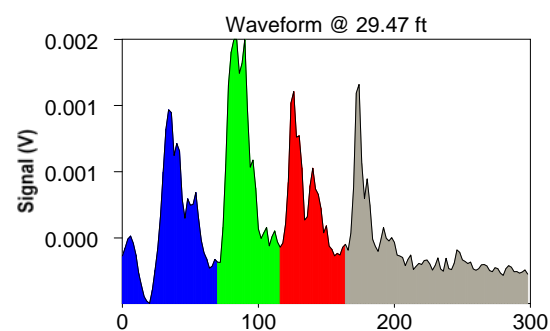
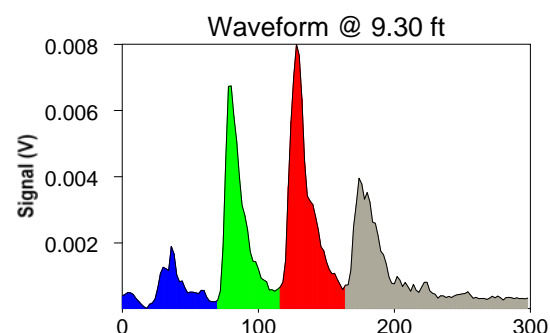
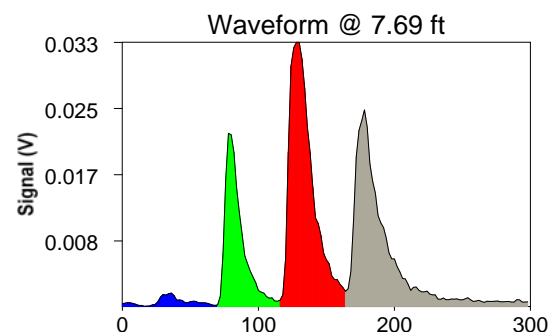
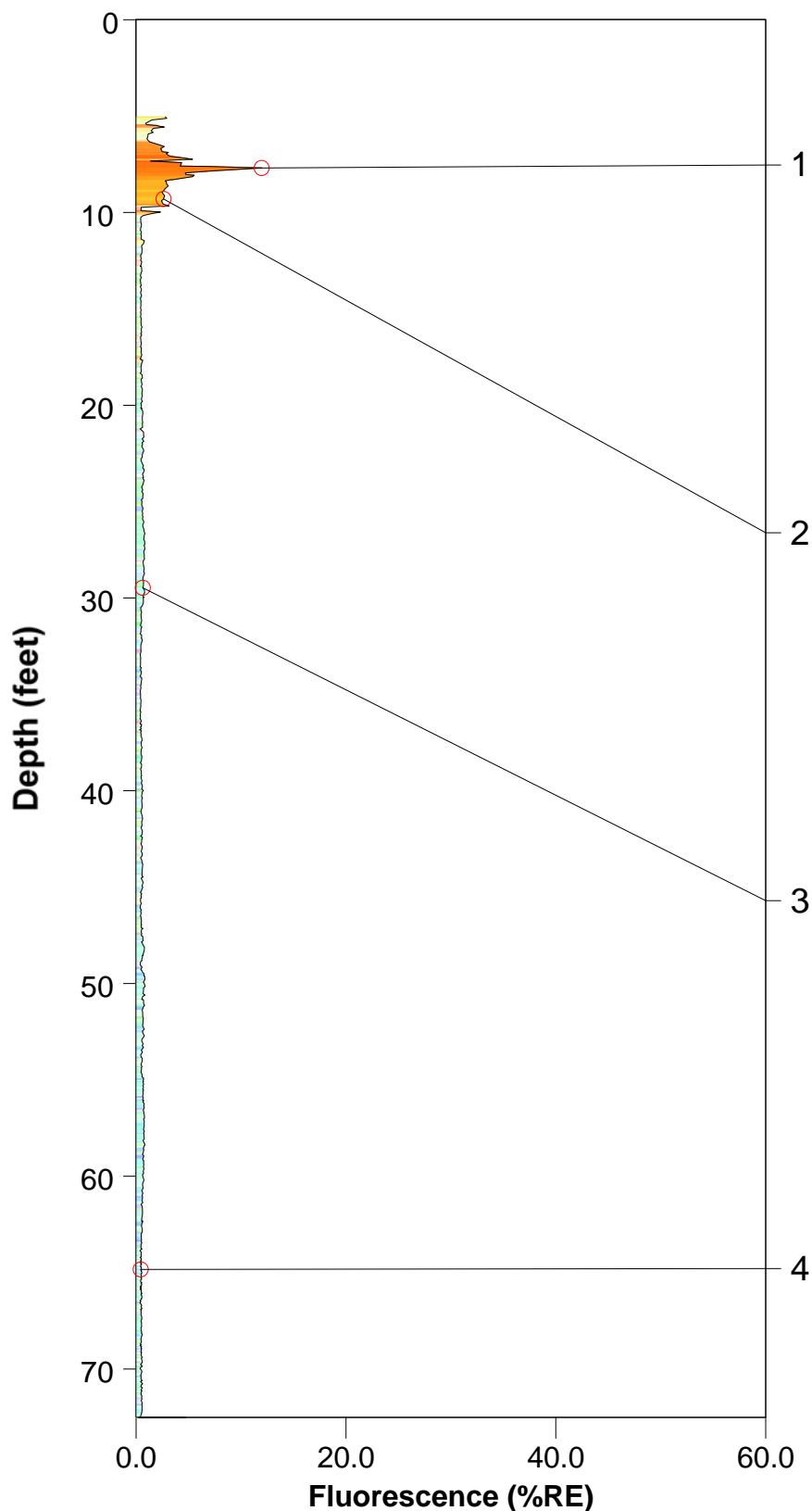
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 11.97% @ 7.69 ft

Final depth BGS: 103.88 ft

FPB-01



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/22/2009 @ 8:41:01 AM

ROST Unit: 1

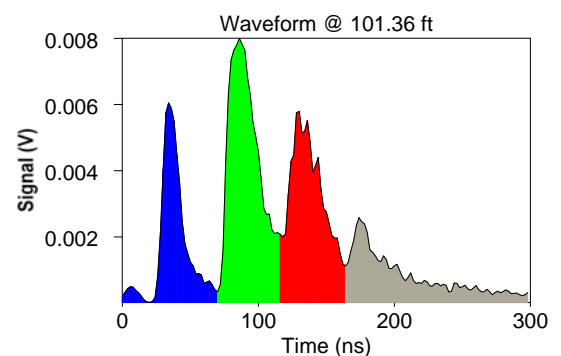
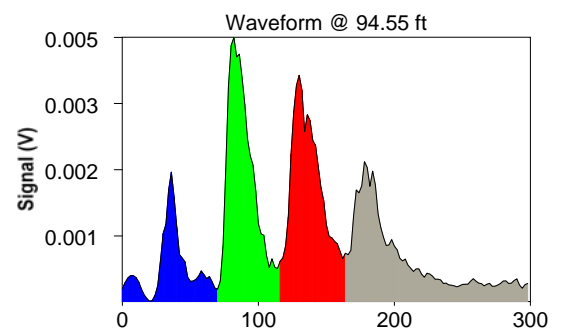
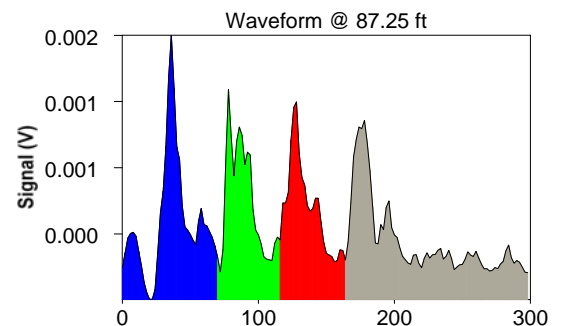
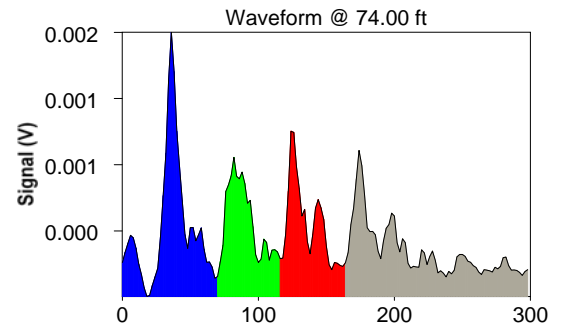
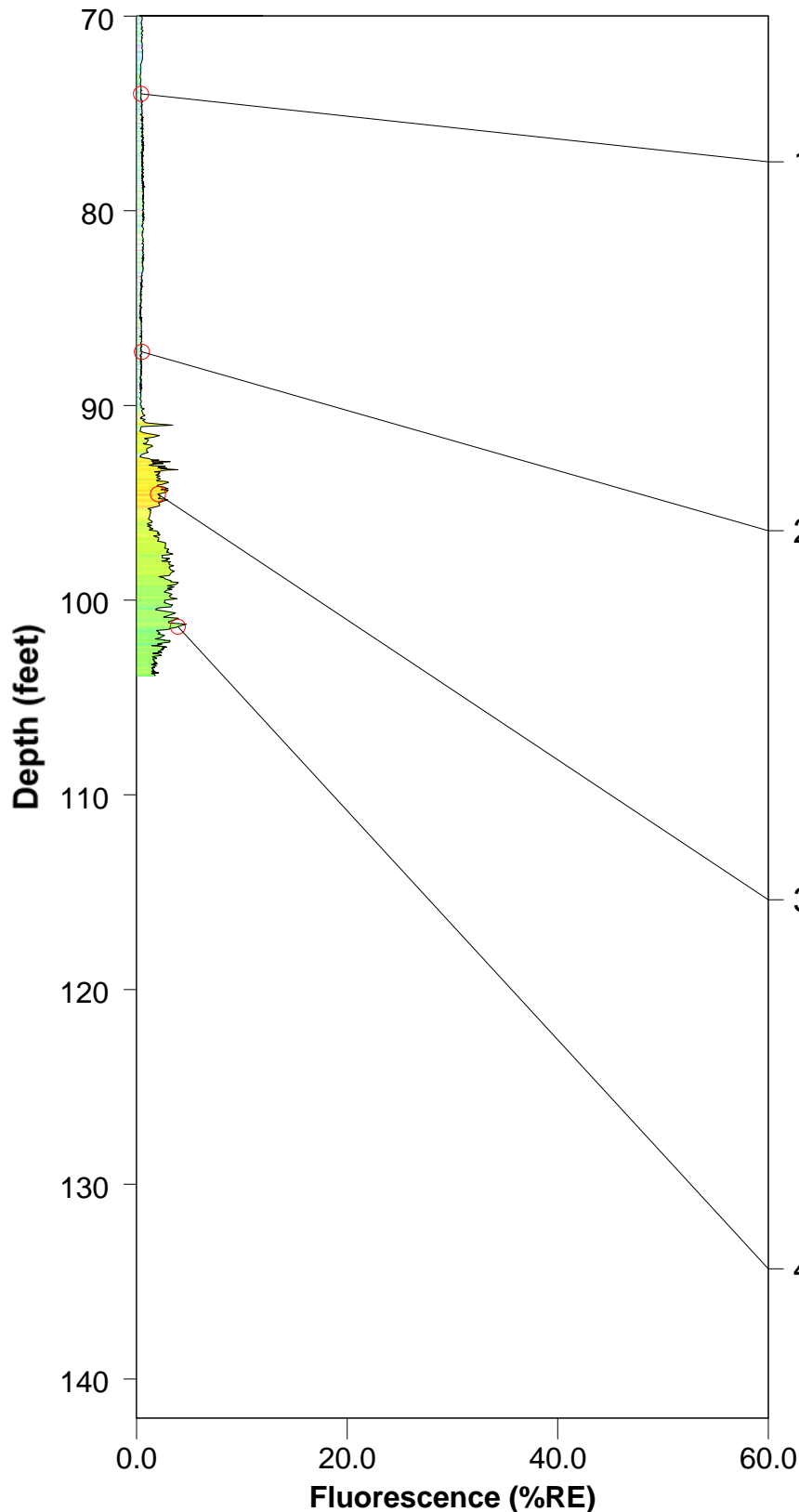
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 11.97% @ 7.69 ft

Final depth BGS: 103.88 ft

FPB-01



ROST Fluorescence Response Data

Site: Former CENCO Refinery

Client: ARCADIS BBL

Date/Time: 2/21/2008 @ 3:53:52 PM

ROST Unit: 1

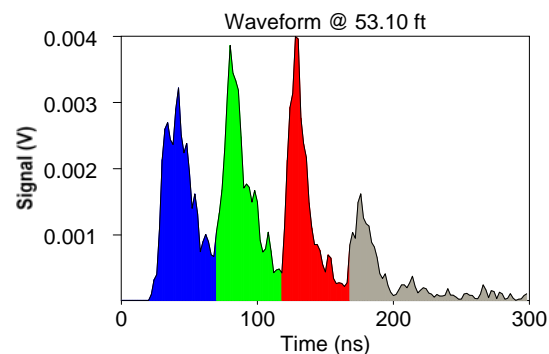
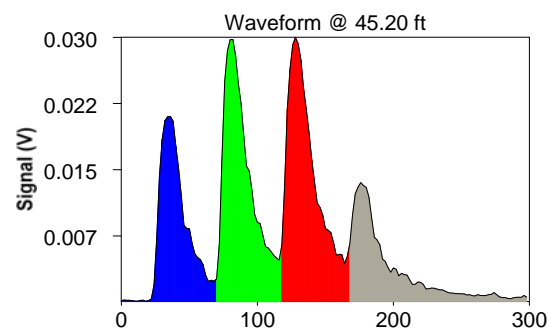
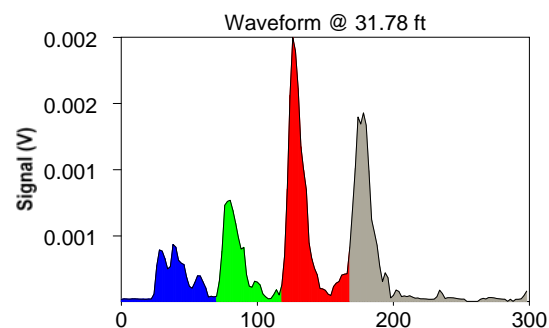
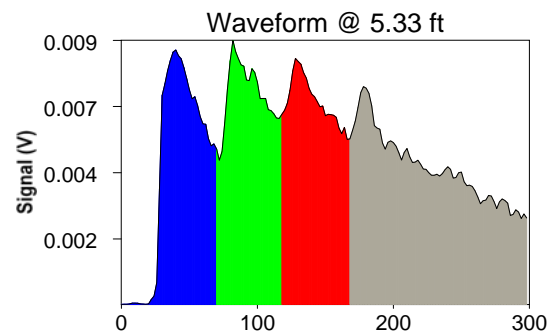
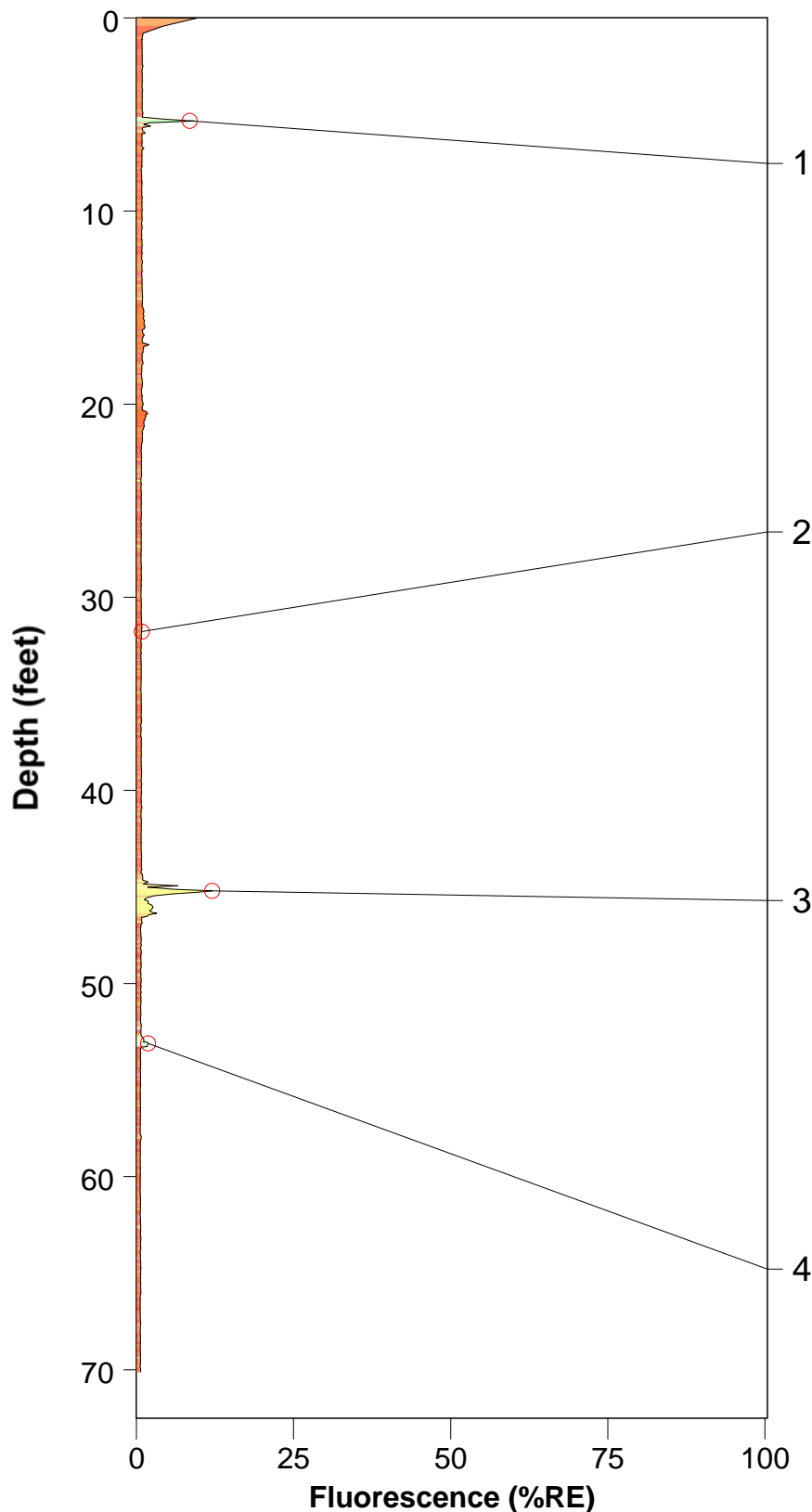
Operator: MITCH

Fugro Job #: 04.0908-0011

Max fluorescence: 11.65% @ 45.20 ft

Final depth BGS: 70.10 ft

FPB-02



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/22/2009 @ 1:17:51 PM

ROST Unit: 1

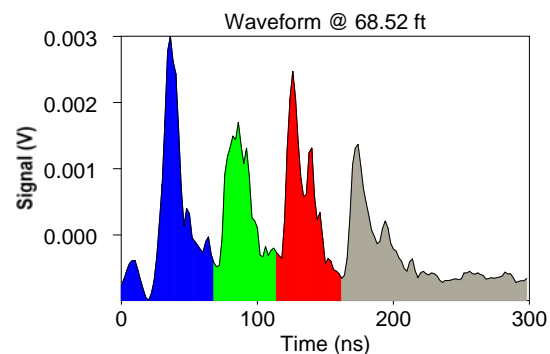
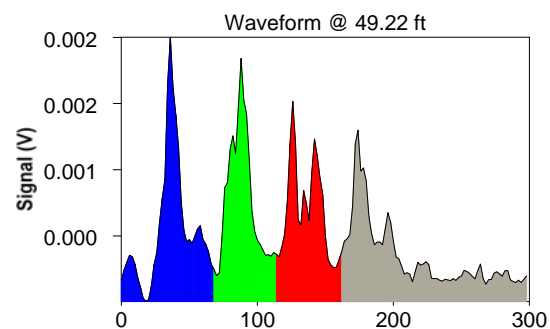
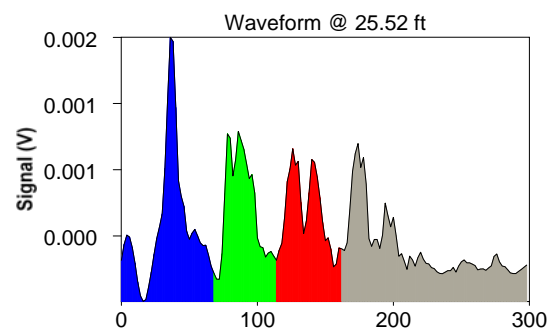
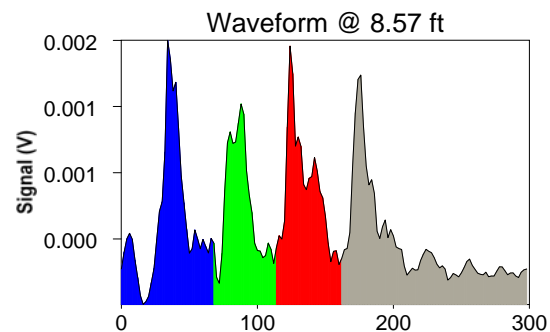
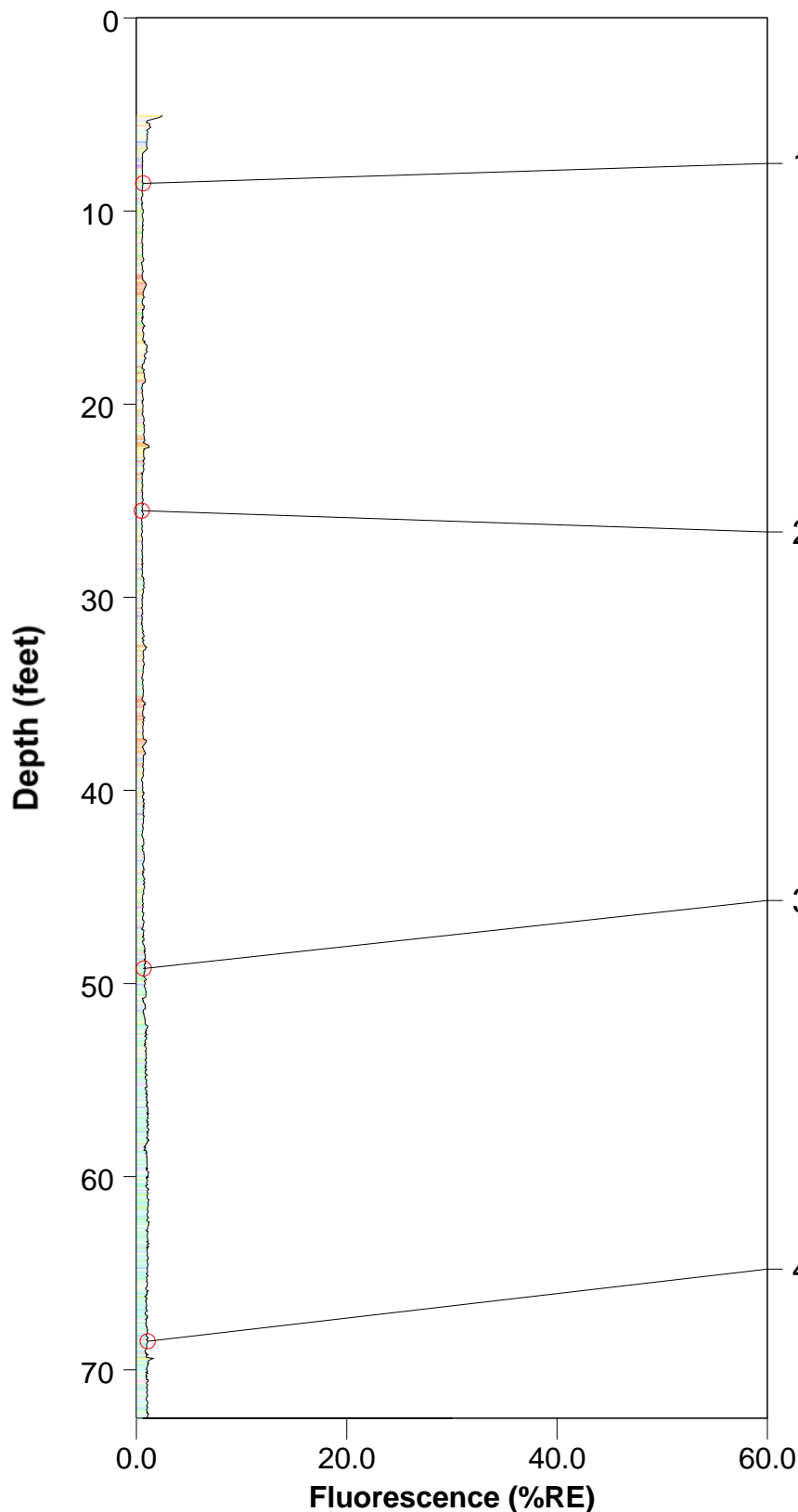
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 30.04% @ 95.53 ft

Final depth BGS: 105.04 ft

FPB-03



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/22/2009 @ 1:17:51 PM

ROST Unit: 1

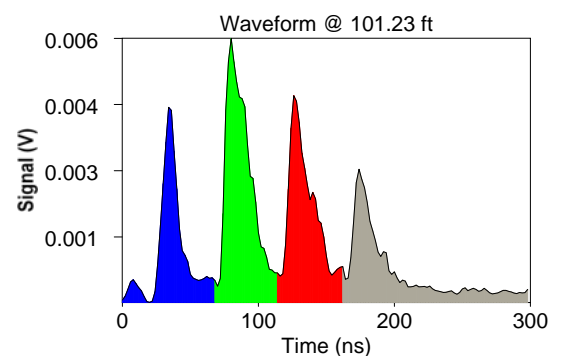
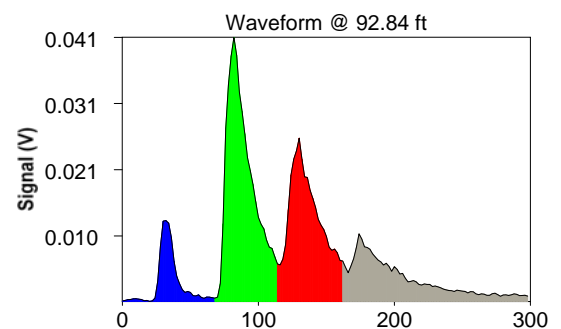
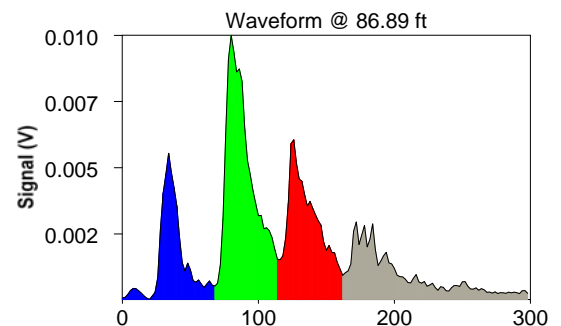
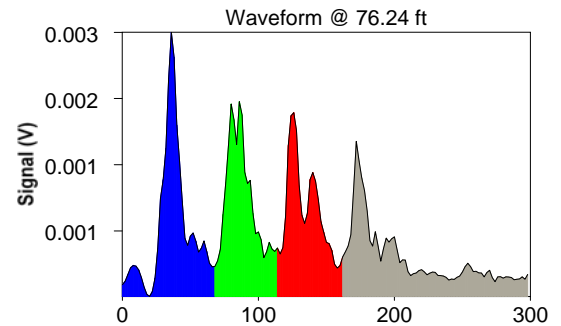
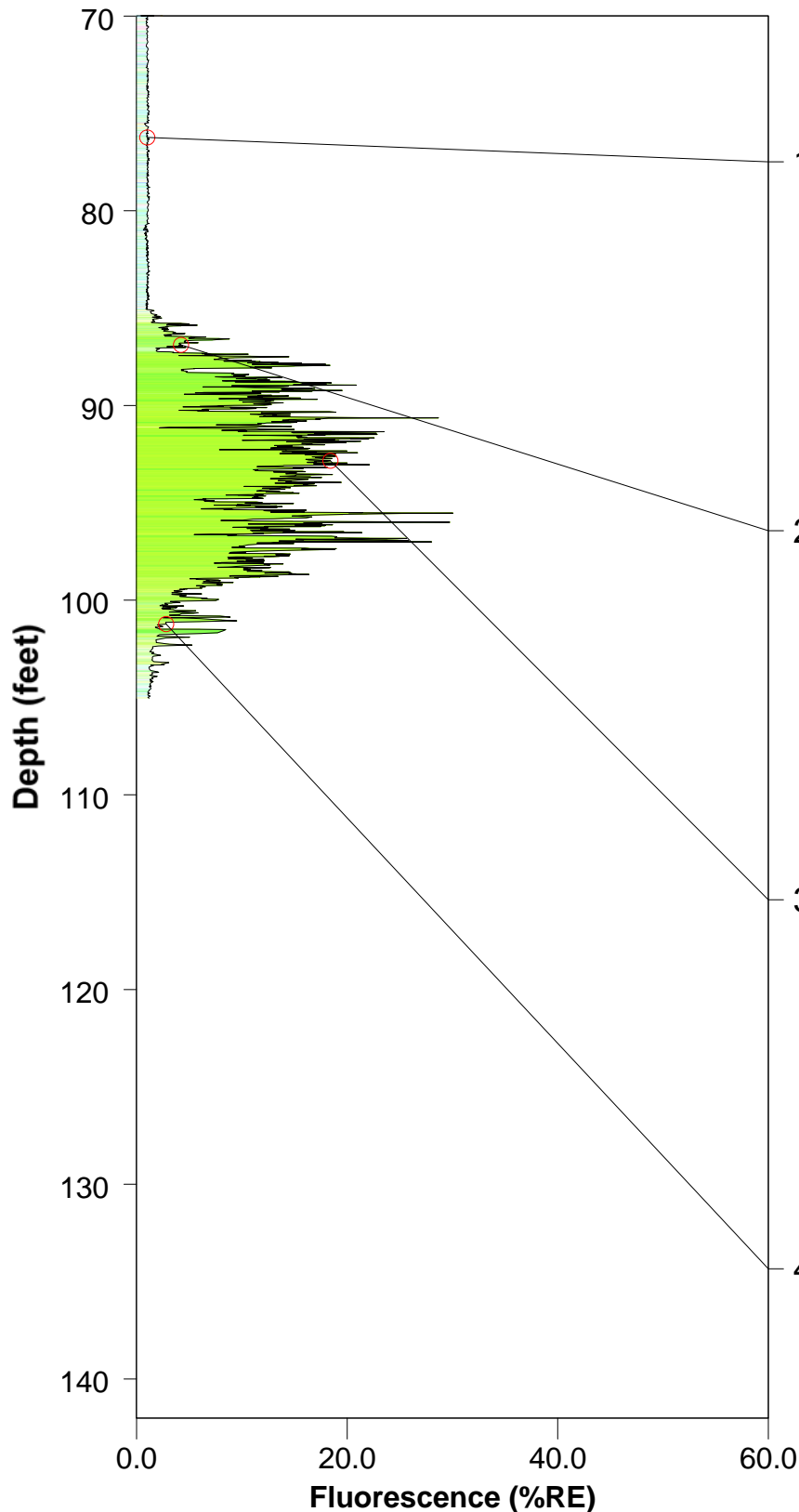
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 30.04% @ 95.53 ft

Final depth BGS: 105.04 ft

FPB-03





CPT Data

Job Number 04.0909-0040

CPT Number FPB-04R

Location Santa Fe Springs-CA

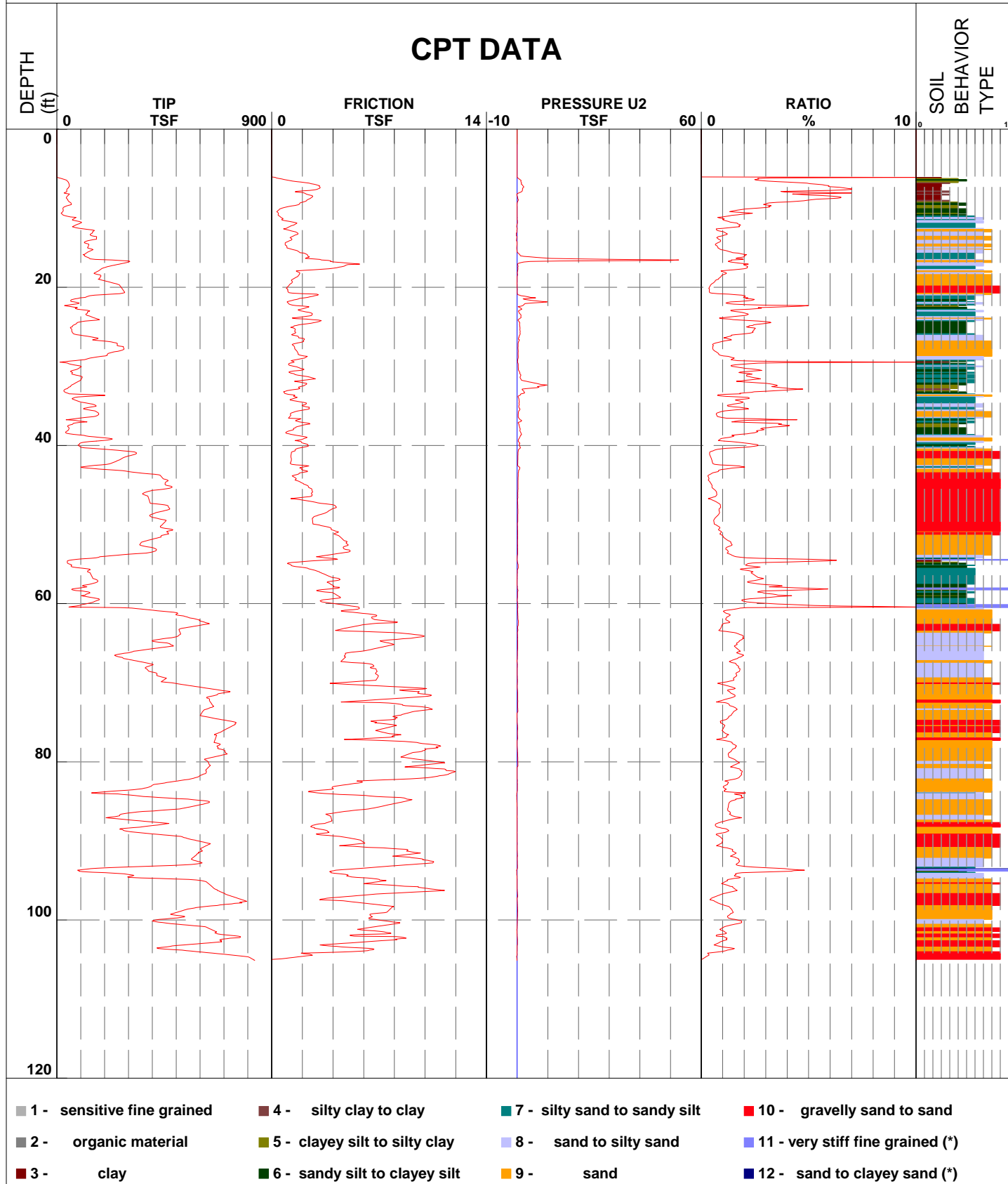
Operator M. Parras

Date and Time 24-Jul-2009 12:20:30

Cone Number F7.5CKE2HAW21165

Client ARCADIS

****First 6 feet hand augered.****



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/24/2009 @ 10:21:25 AM

ROST Unit: 1

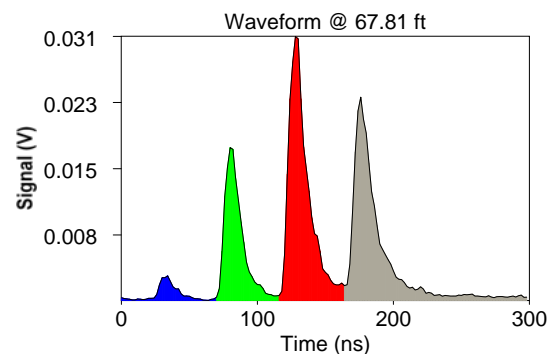
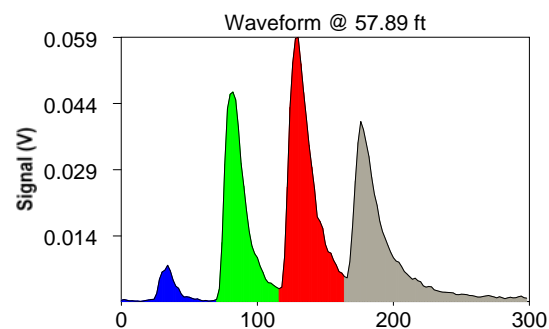
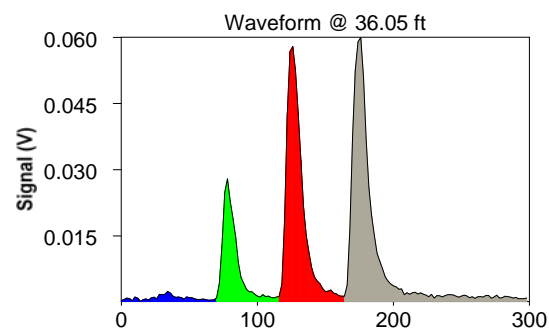
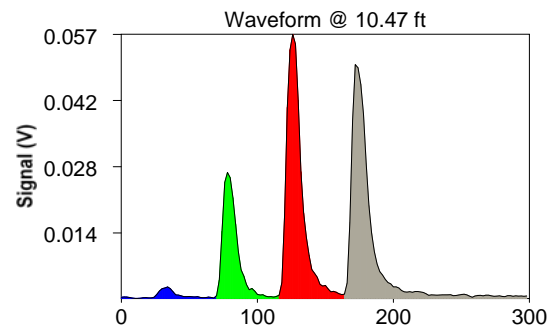
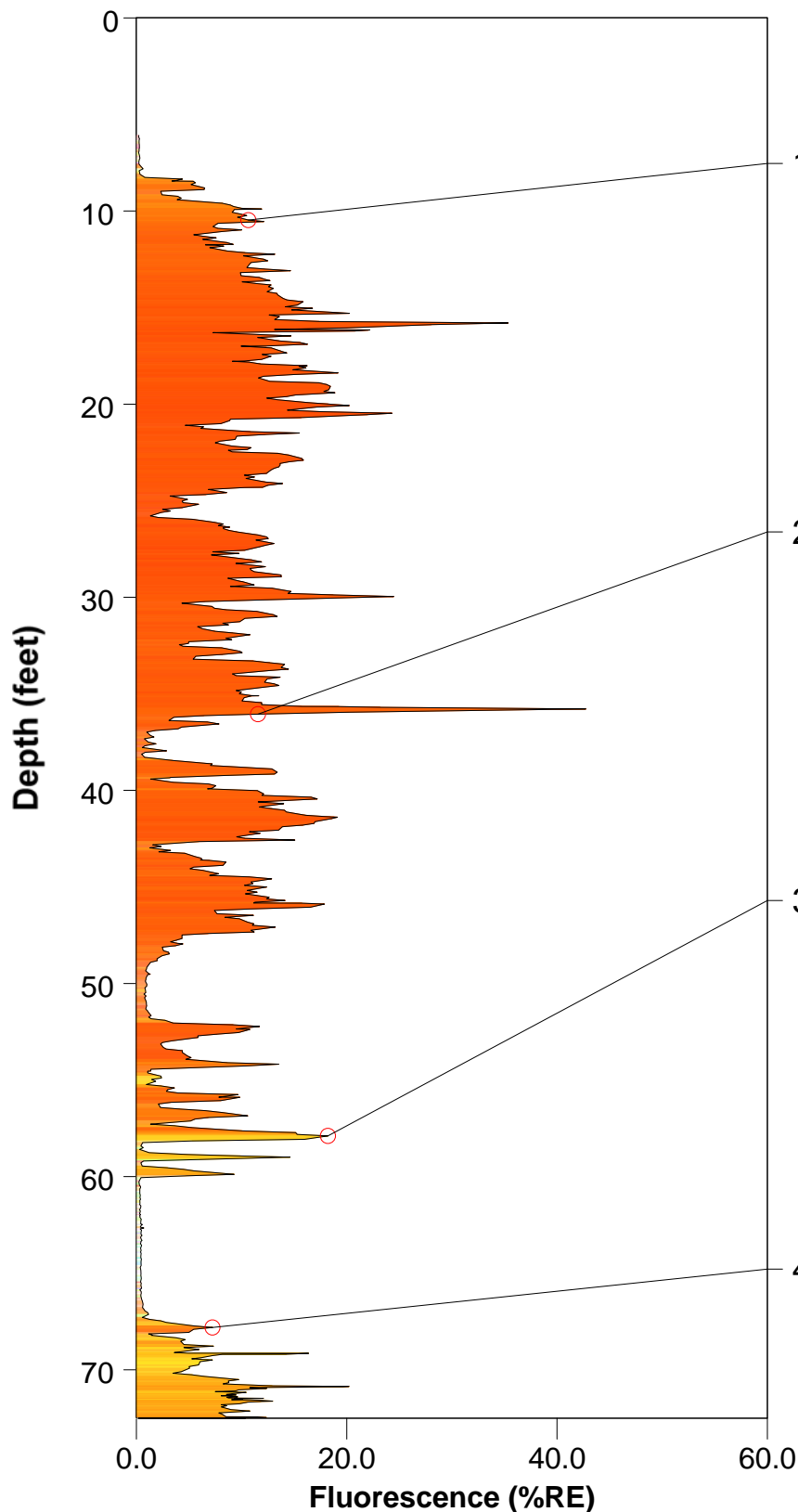
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 42.73% @ 35.78 ft

Final depth BGS: 109.26 ft

FPB-04R



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/24/2009 @ 10:21:25 AM

ROST Unit: 1

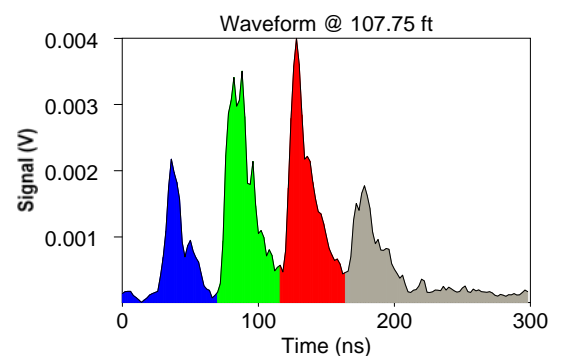
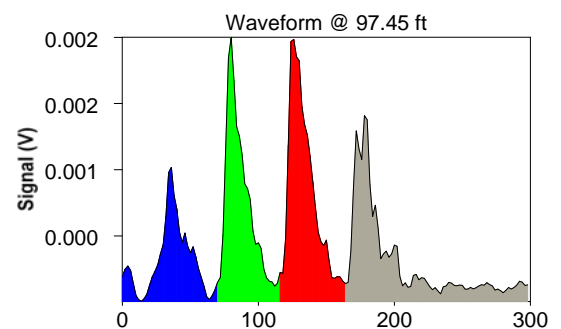
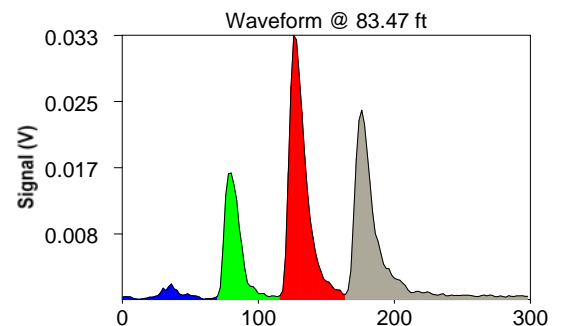
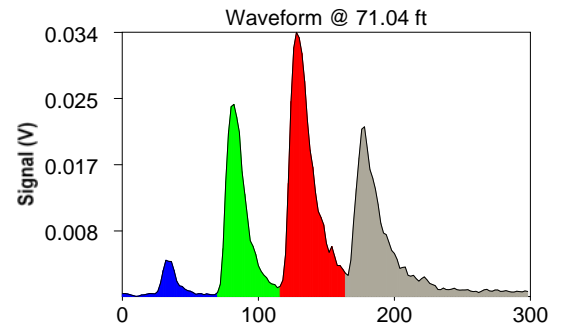
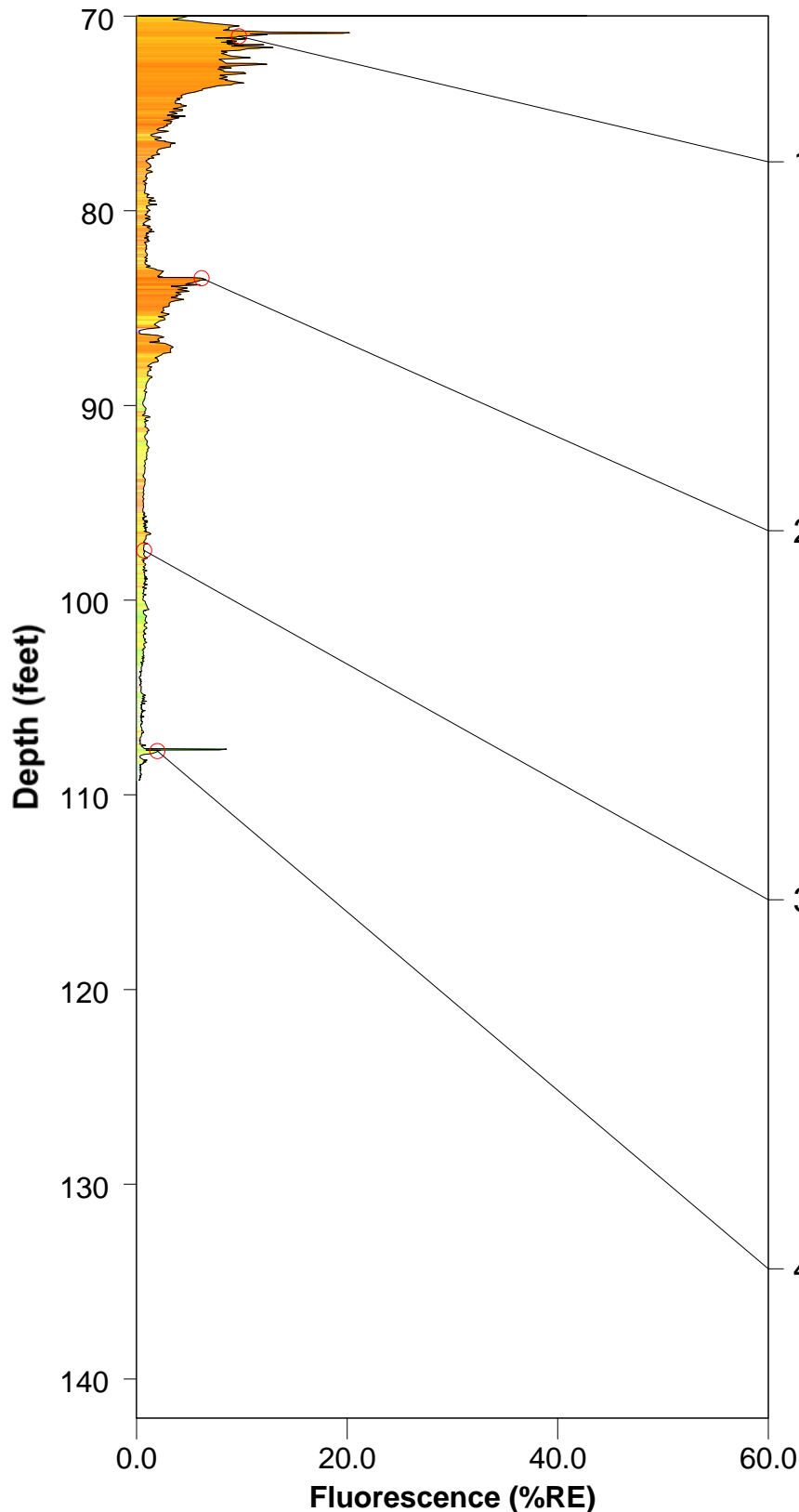
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 42.73% @ 35.78 ft

Final depth BGS: 109.26 ft

FPB-04R



ROST Fluorescence Response Data

Site: Former CENCO Refinery

Client: ARCADIS BBL

Date/Time: 2/21/2008 @ 8:17:57 AM

ROST Unit: 1

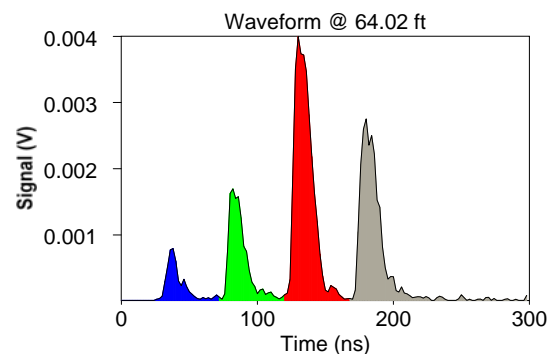
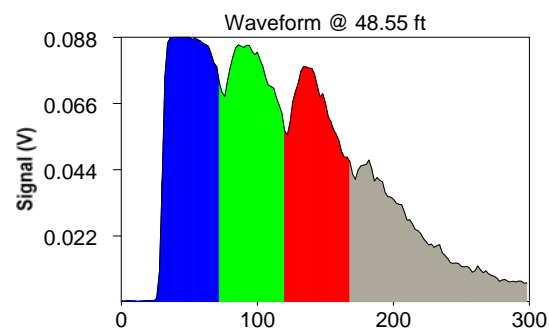
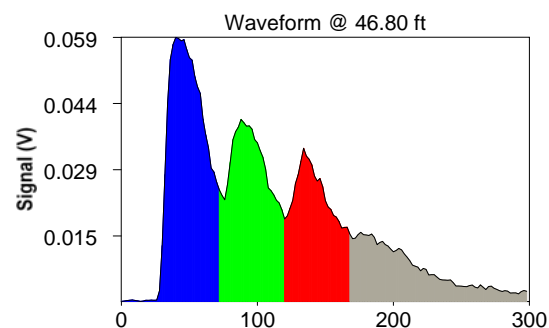
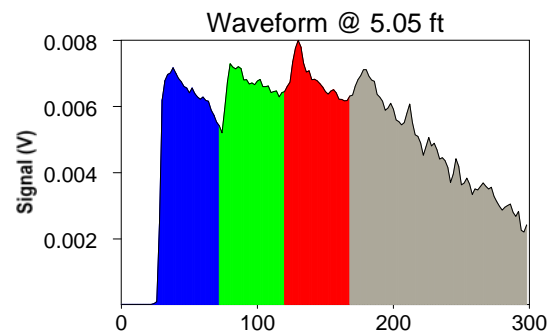
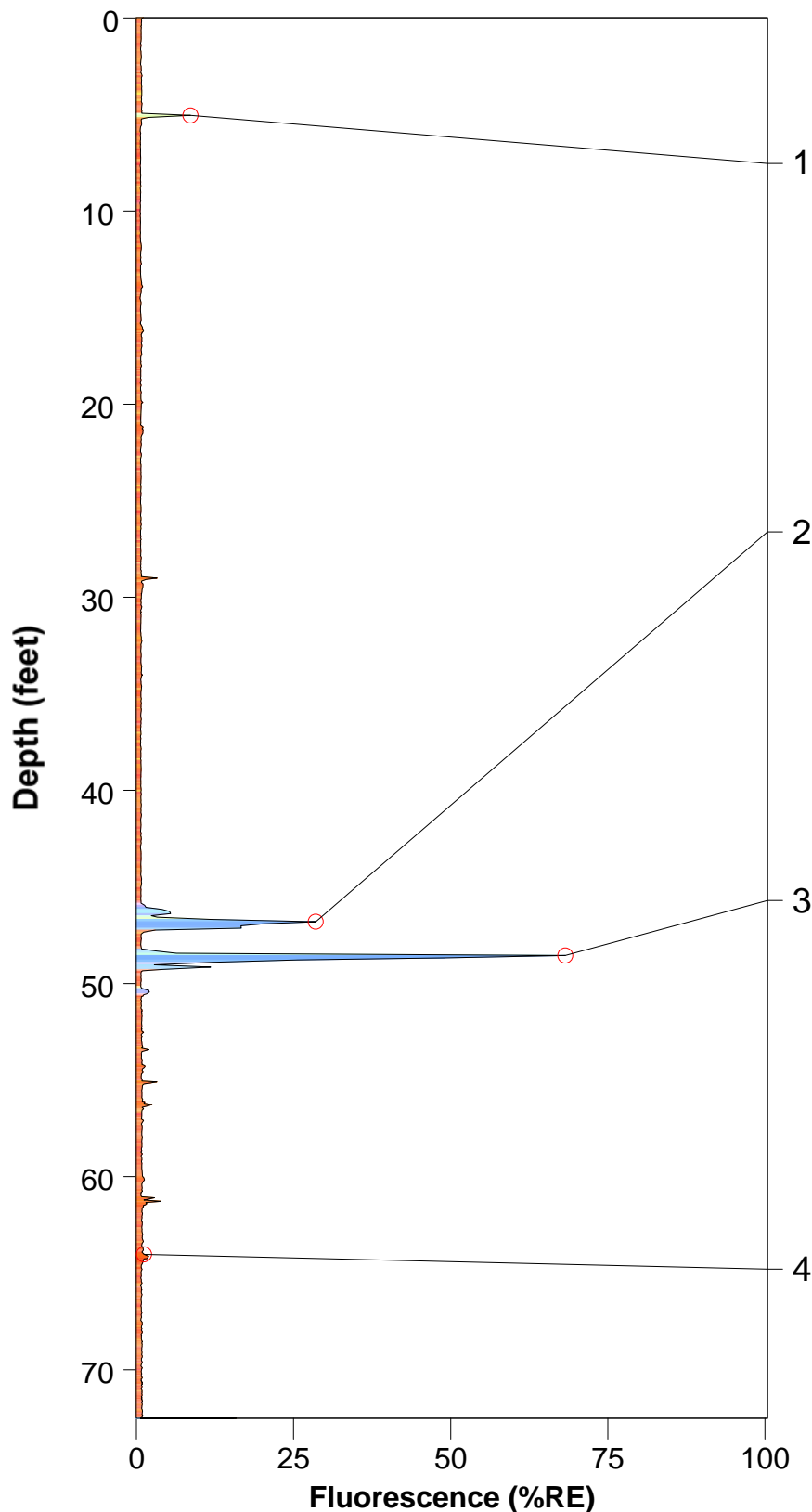
Operator: MITCH

Fugro Job #: 04.0908-0011

Max fluorescence: 67.83% @ 48.55 ft

Final depth BGS: 100.71 ft

FPB-05



ROST Fluorescence Response Data

Site: Former CENCO Refinery

Client: ARCADIS BBL

Date/Time: 2/21/2008 @ 8:17:57 AM

ROST Unit: 1

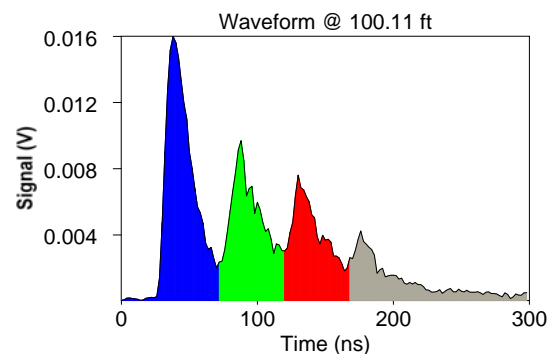
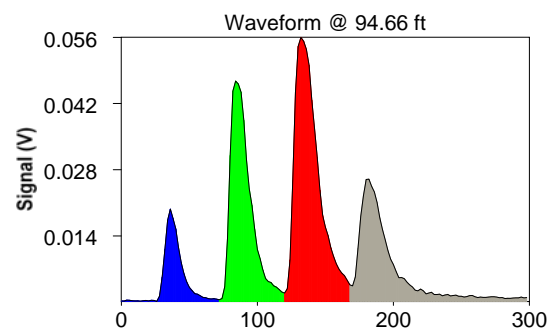
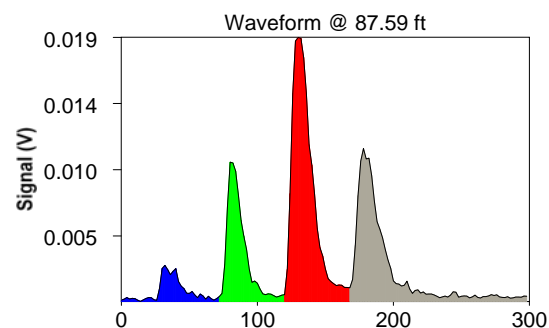
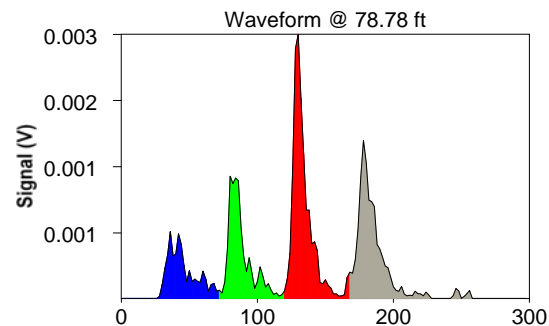
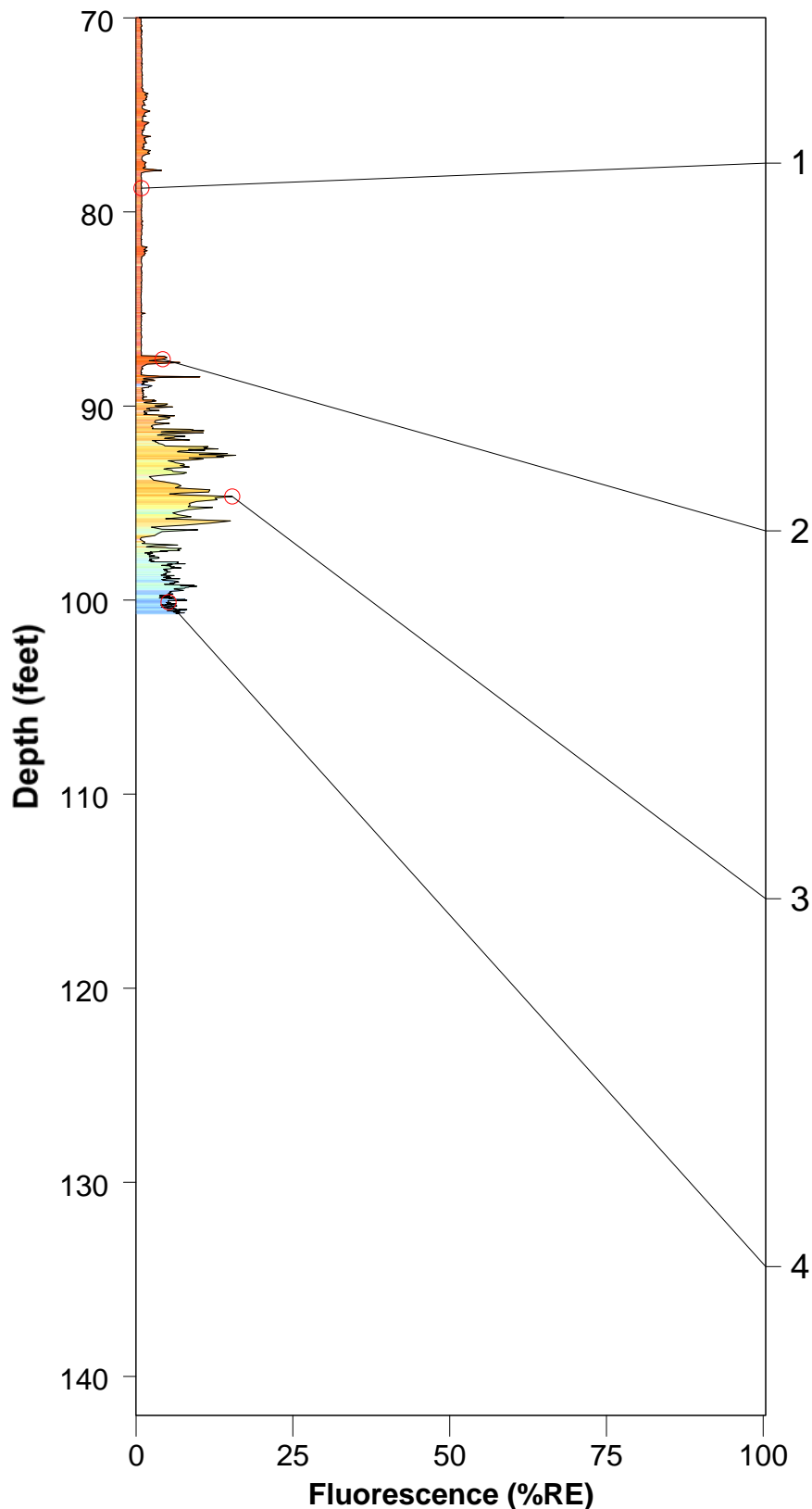
Operator: MITCH

Fugro Job #: 04.0908-0011

Max fluorescence: 67.83% @ 48.55 ft

Final depth BGS: 100.71 ft

FPB-05



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/23/2009 @ 3:10:53 PM

ROST Unit: 1

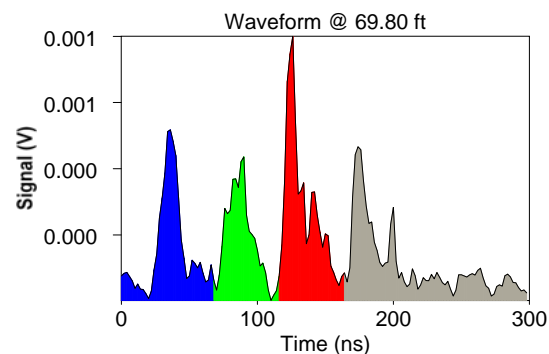
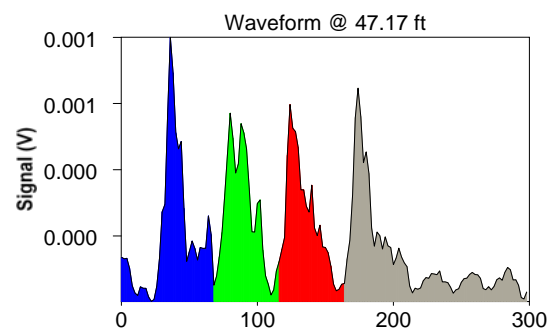
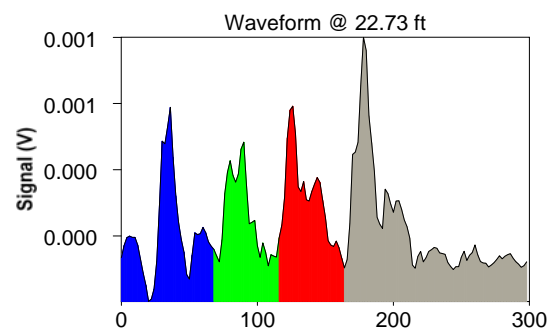
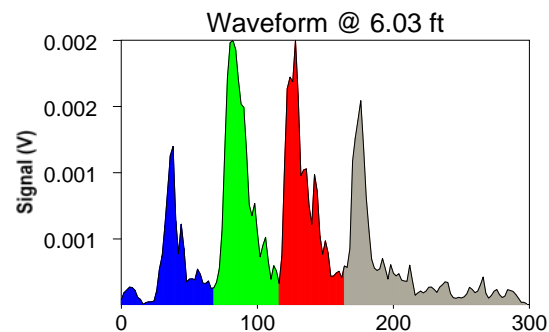
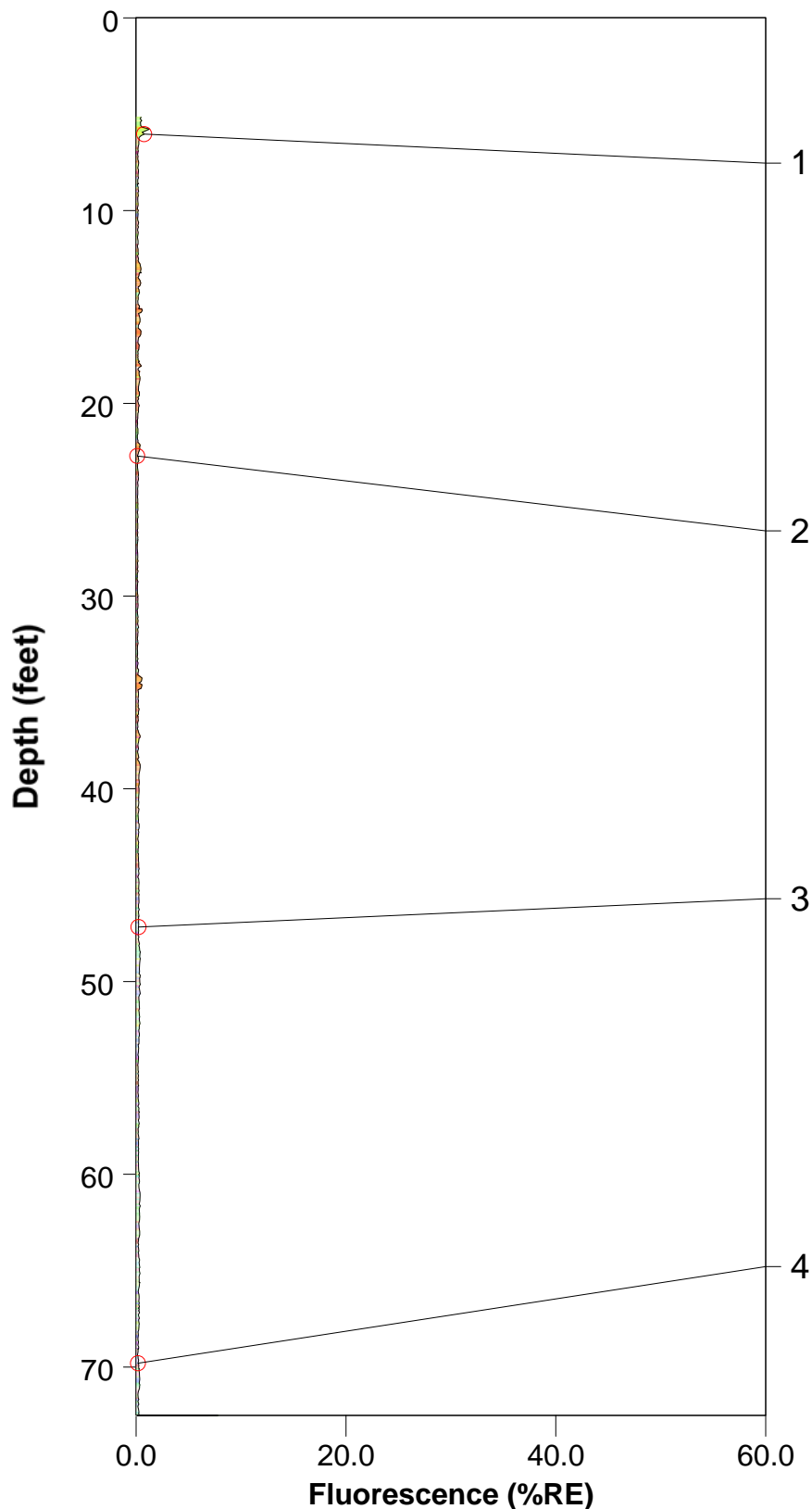
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 7.79% @ 93.24 ft

Final depth BGS: 103.02 ft

FPB-06



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/23/2009 @ 3:10:53 PM

ROST Unit: 1

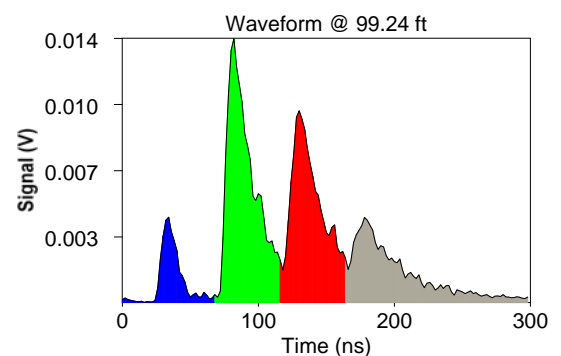
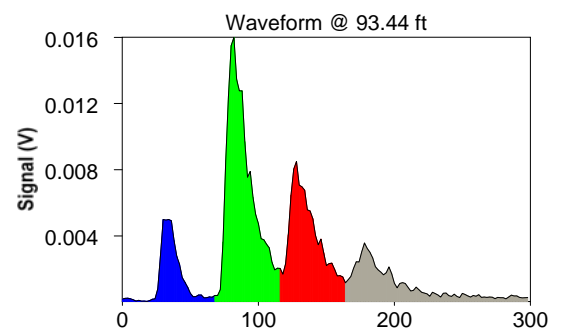
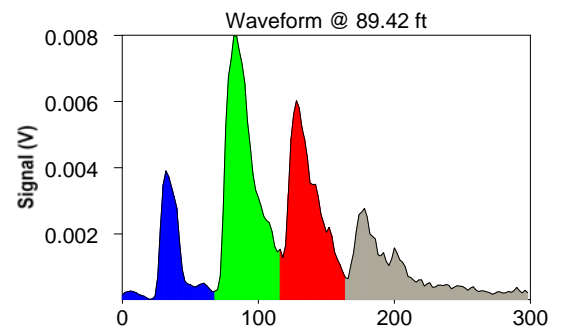
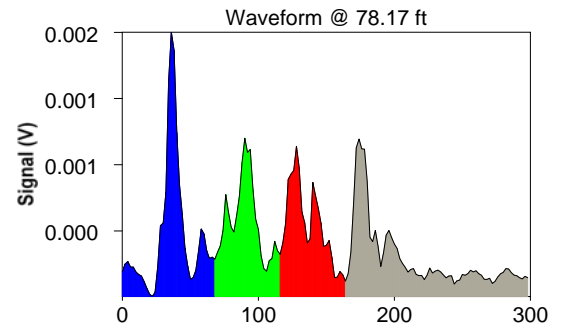
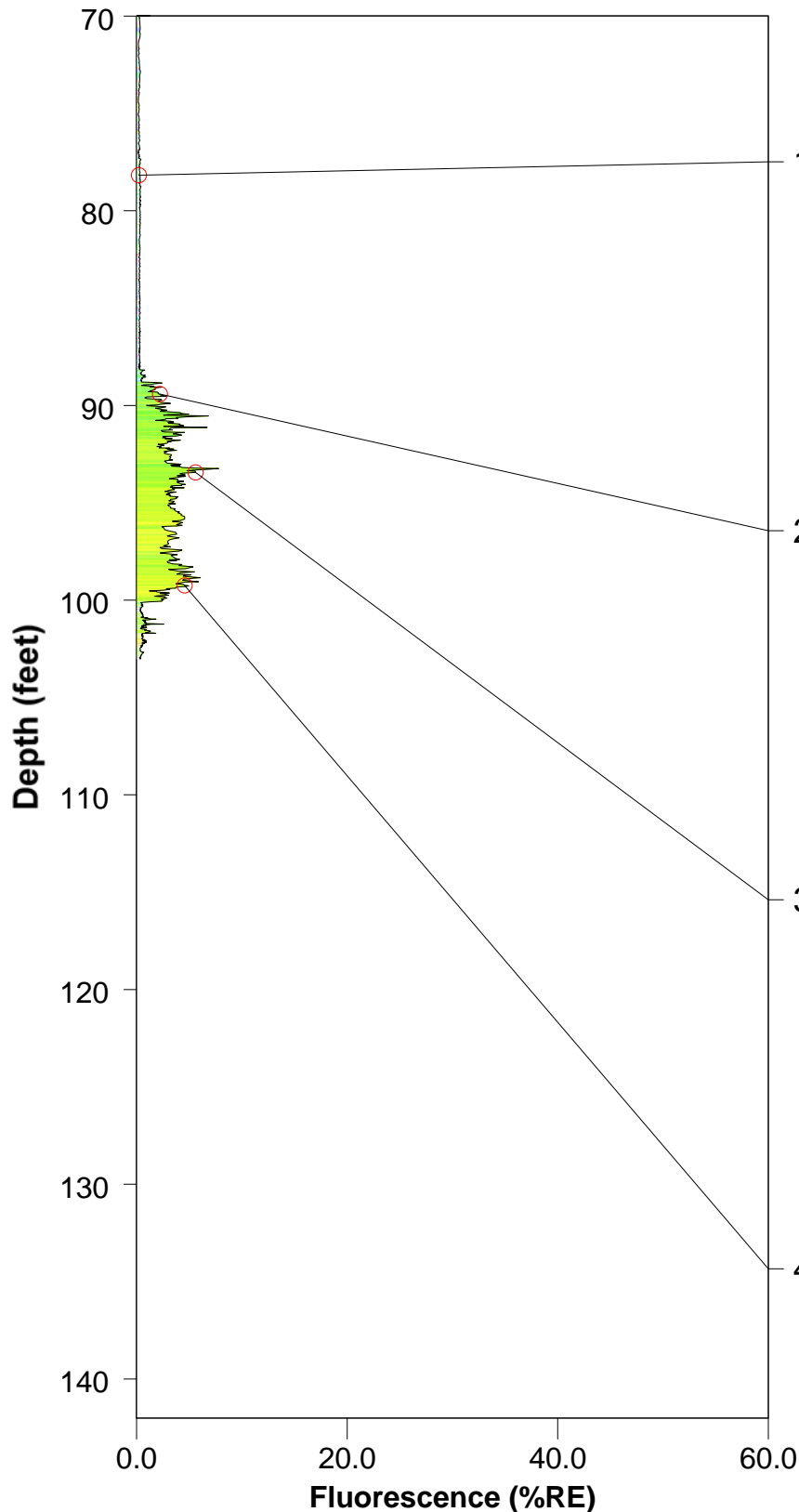
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 7.79% @ 93.24 ft

Final depth BGS: 103.02 ft

FPB-06



ROST Fluorescence Response Data

Site: Former CENCO Refinery

Client: ARCADIS BBL

Date/Time: 2/21/2008 @ 2:19:19 PM

ROST Unit: 1

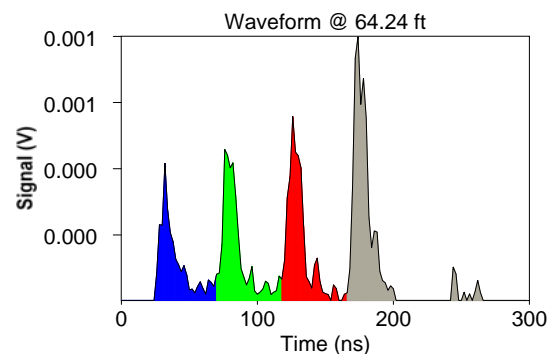
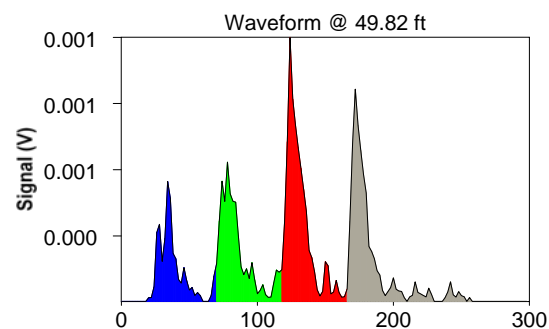
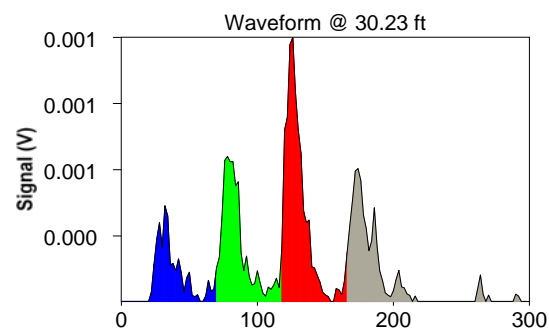
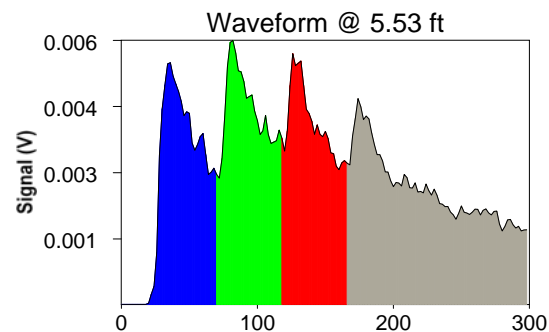
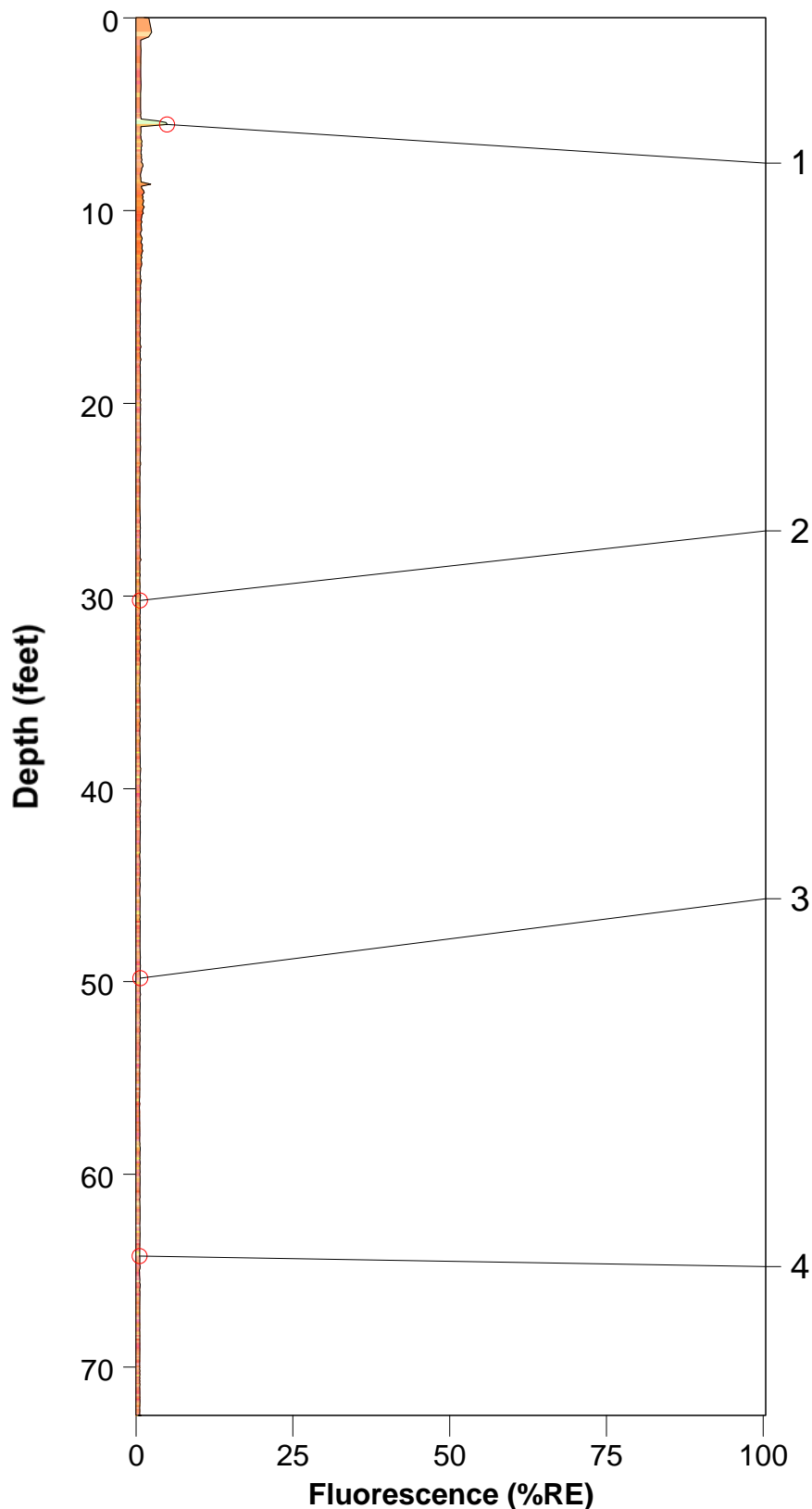
Operator: MITCH

Fugro Job #: 04.0908-0011

Max fluorescence: 4.55% @ 5.53 ft

Final depth BGS: 100.01 ft

FPB-07



ROST Fluorescence Response Data

Site: Former CENCO Refinery

Client: ARCADIS BBL

Date/Time: 2/21/2008 @ 2:19:19 PM

ROST Unit: 1

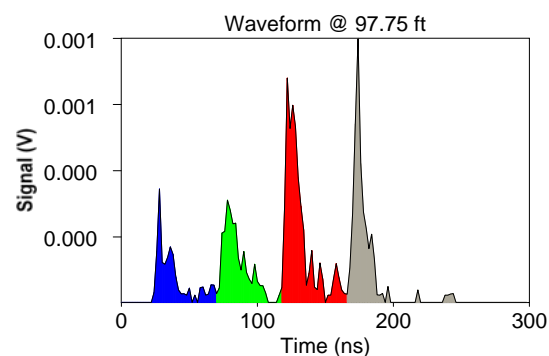
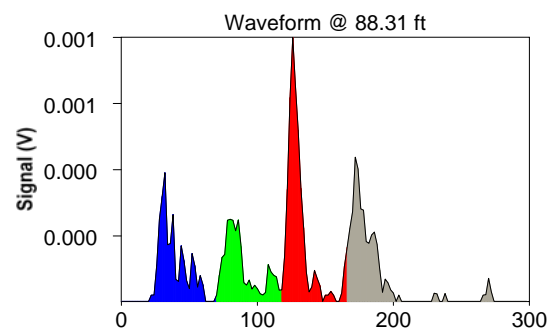
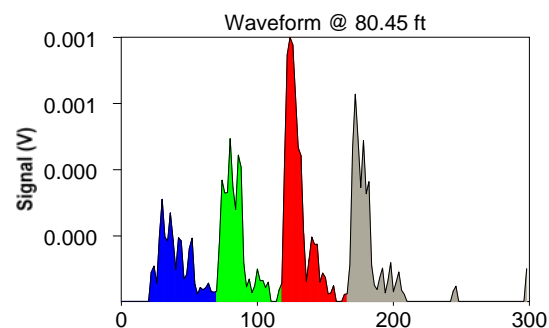
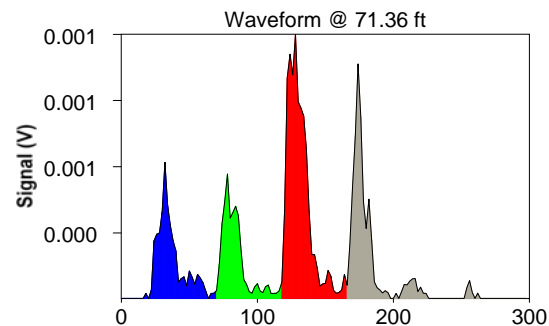
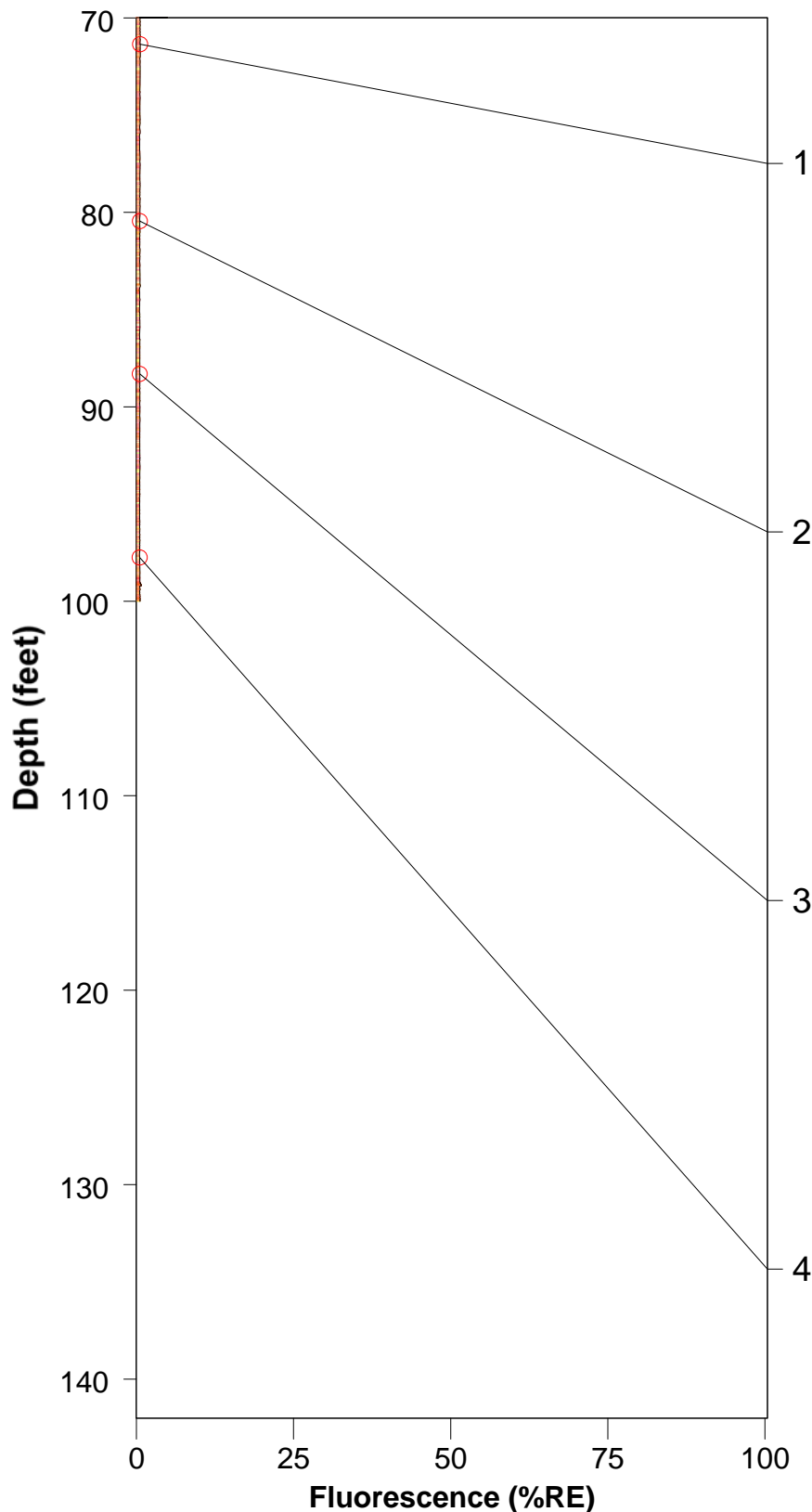
Operator: MITCH

Fugro Job #: 04.0908-0011

Max fluorescence: 4.55% @ 5.53 ft

Final depth BGS: 100.01 ft

FPB-07





CPT Data

Job Number 04.0909-0040

CPT Number FPB-08R

Location Santa Fe Springs-CA

Operator M. Parras

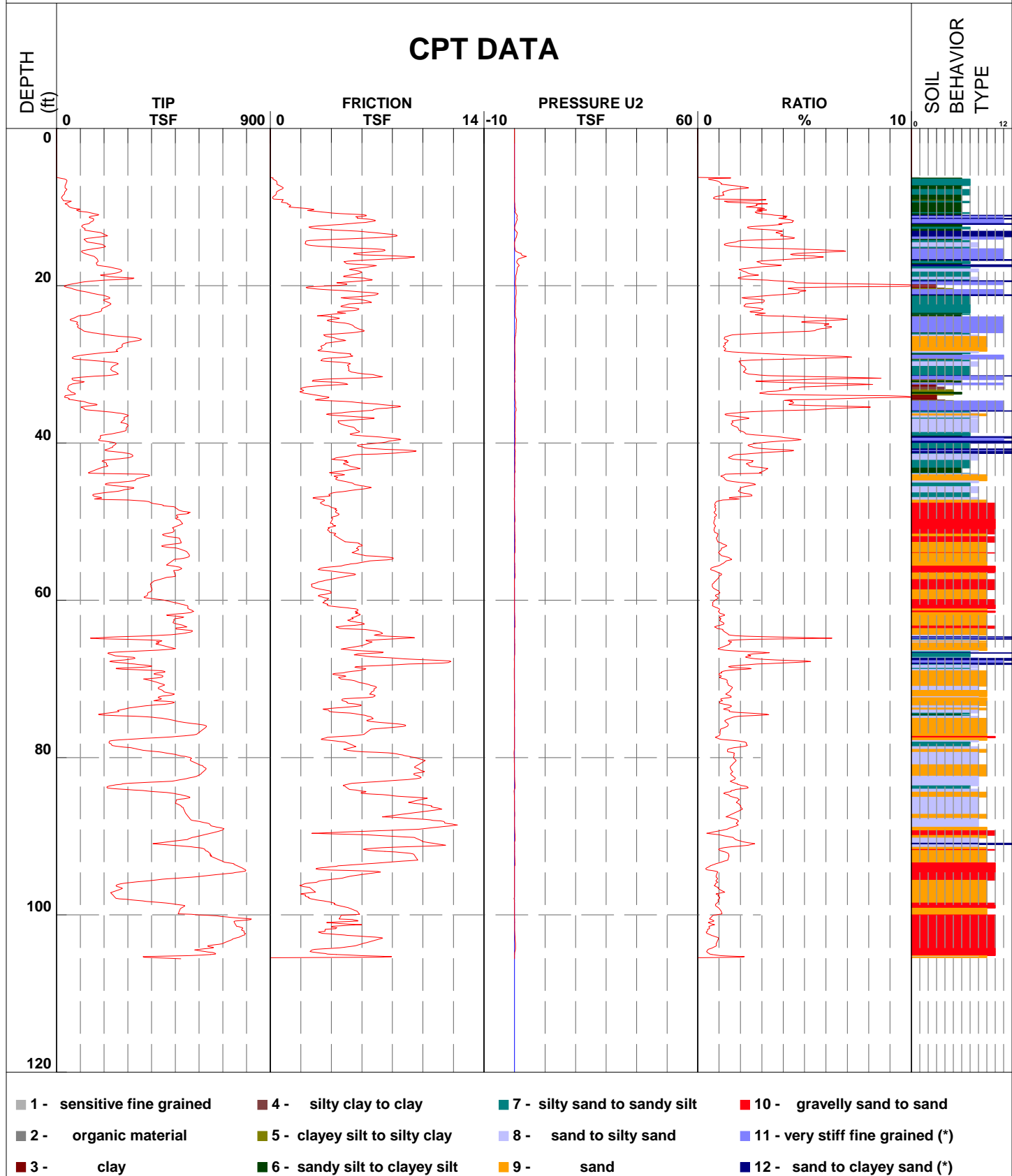
Date and Time 24-Jul-2009 14:11:26

Cone Number F7.5CKE2HAW21165

Client

ARCADIS

First 6.23 feet hand augered.



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/23/2009 @ 10:51:54 AM

ROST Unit: 1

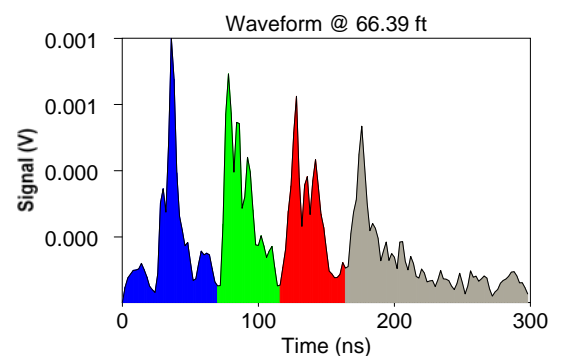
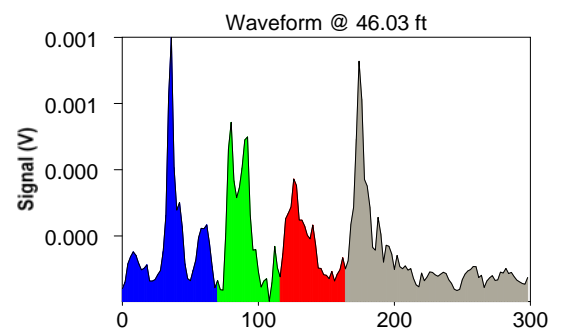
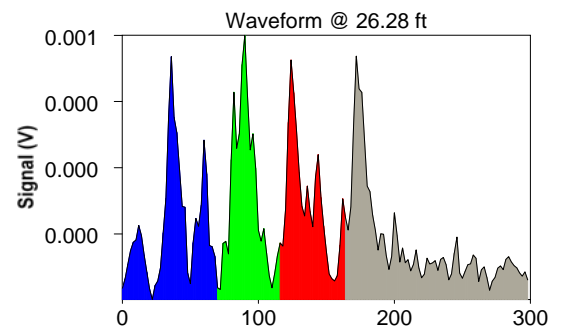
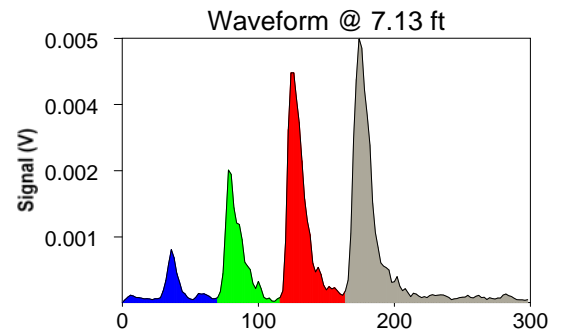
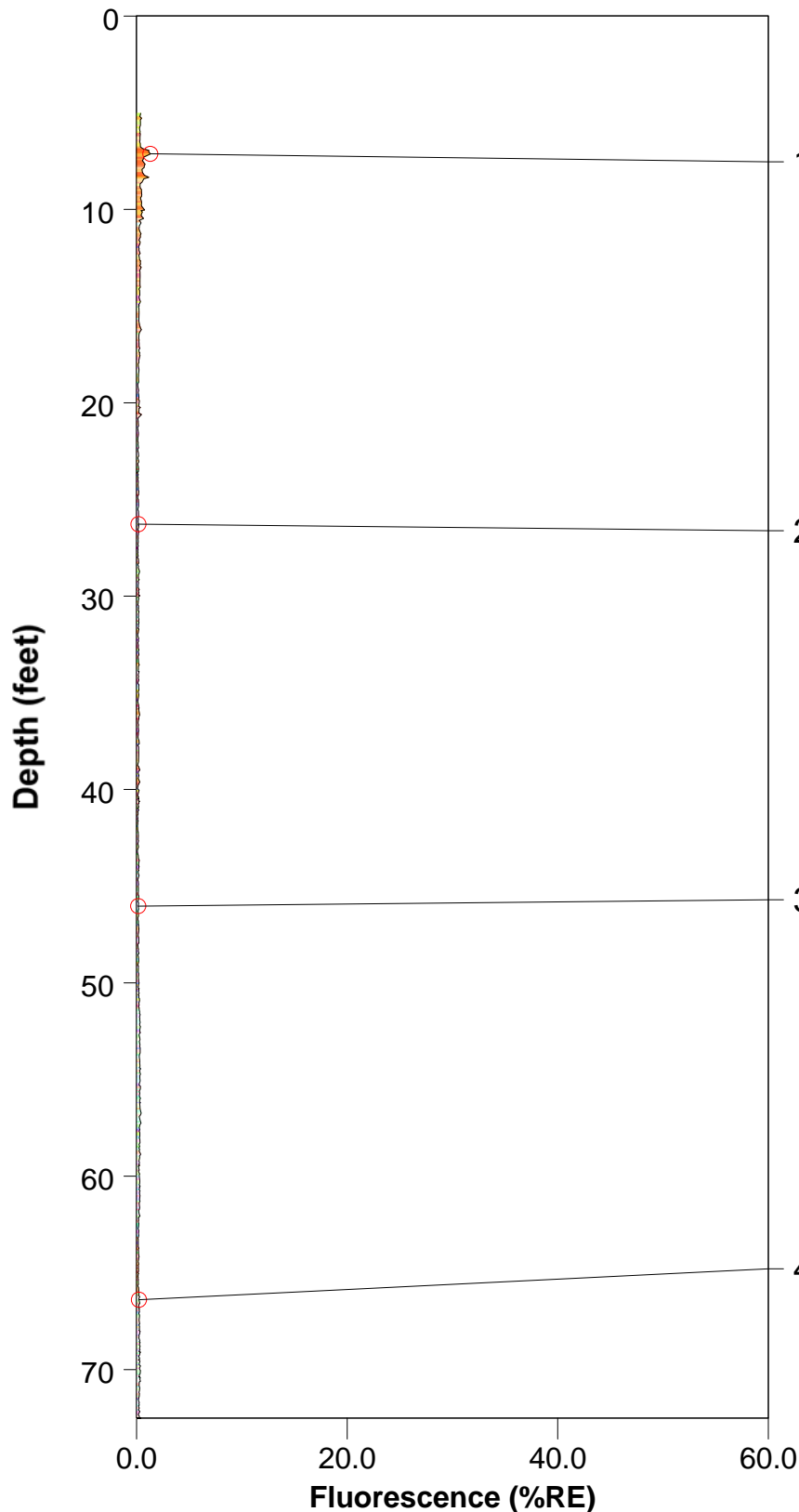
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 1.31% @ 7.13 ft

Final depth BGS: 100.05 ft

FPB-08



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/23/2009 @ 10:51:54 AM

ROST Unit: 1

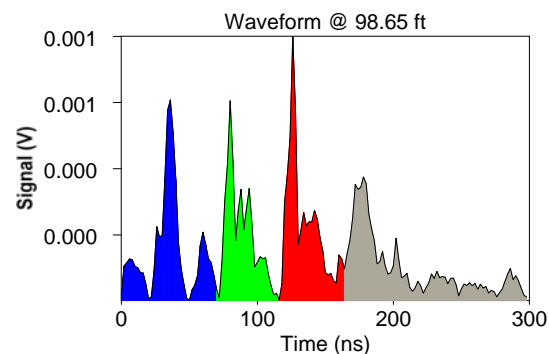
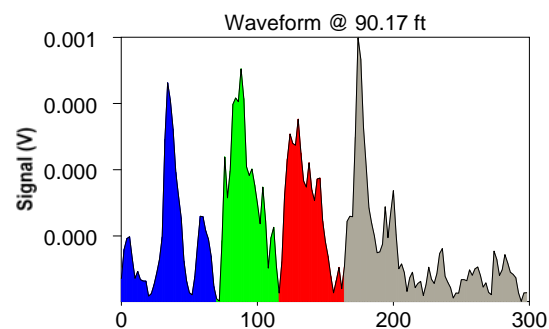
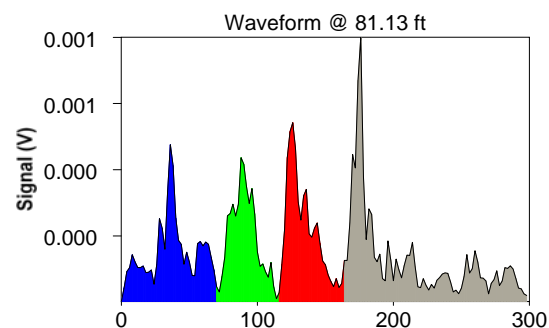
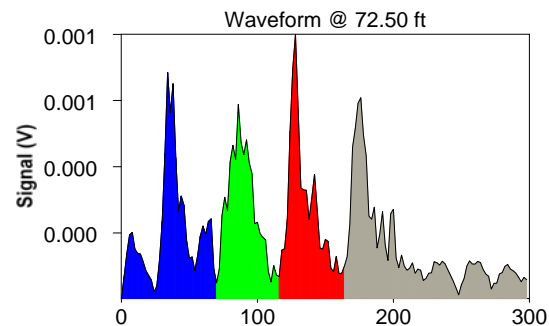
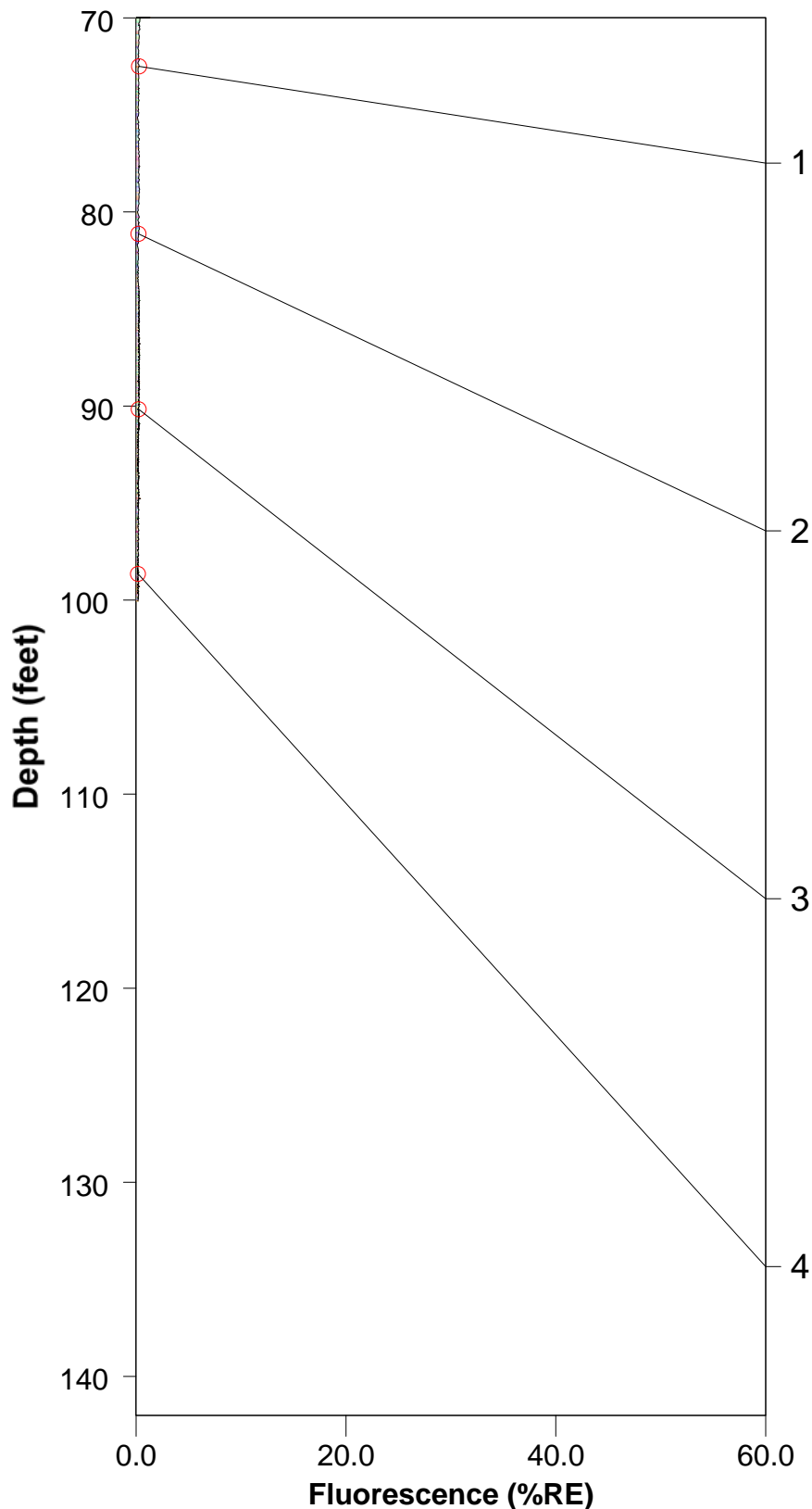
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 1.31% @ 7.13 ft

Final depth BGS: 100.05 ft

FPB-08

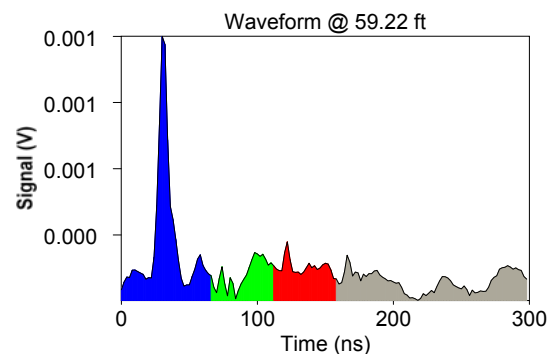
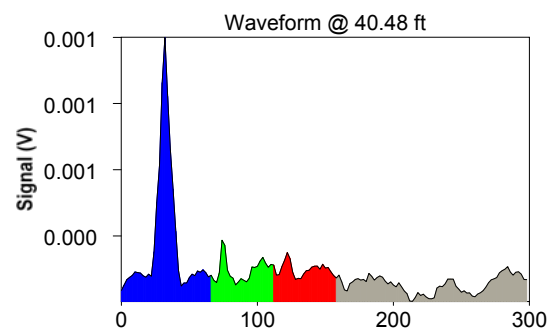
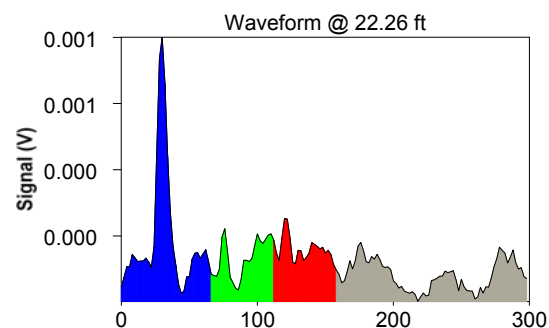
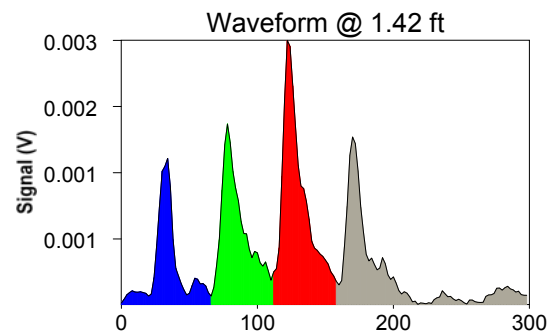
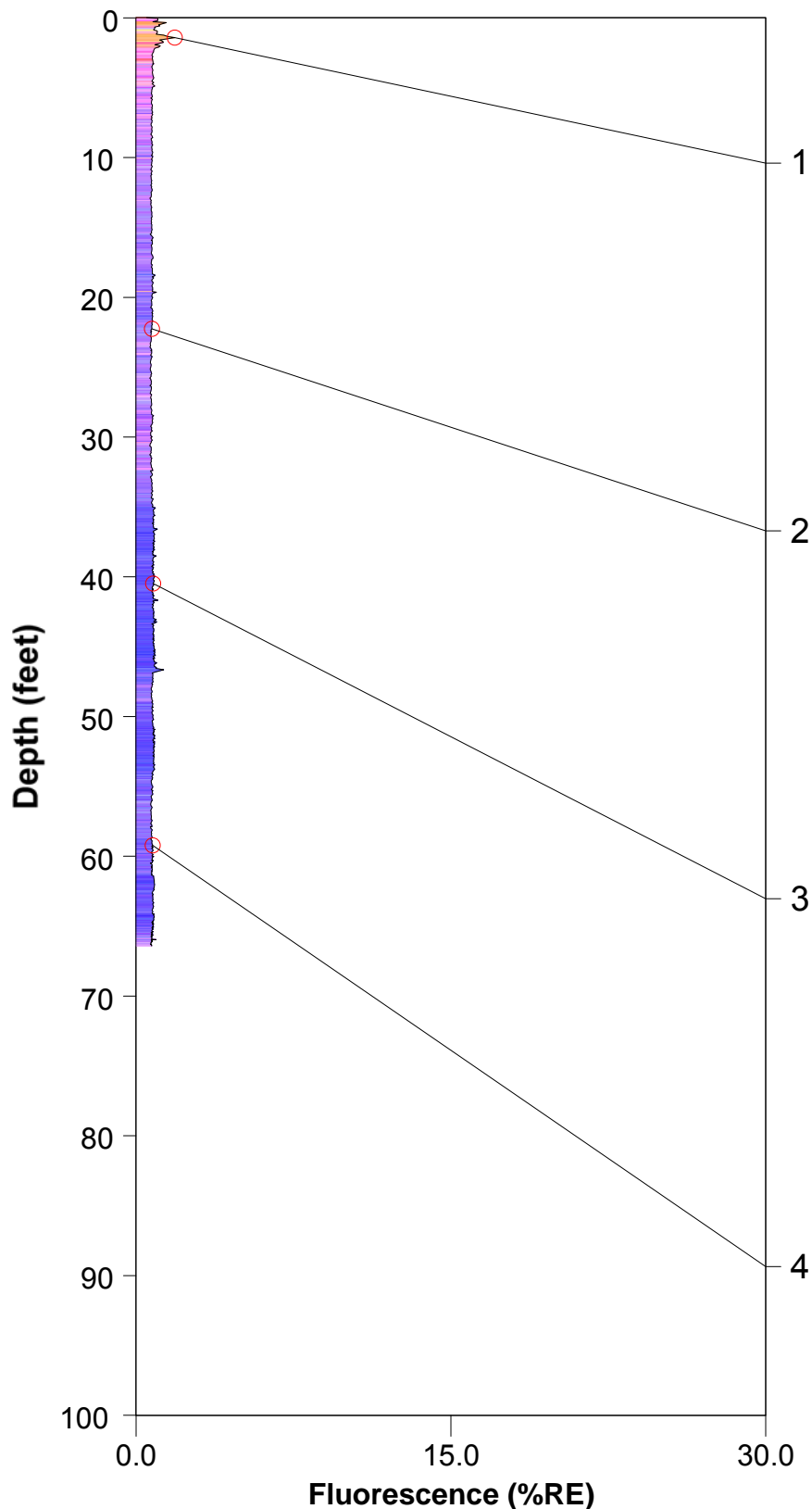


ROST Fluorescence Response Data

Site: Cenco Ref. Santa Fe Springs, CA
 Client: Murex Env., Inc.
 Date/Time: 3/29/2011 @ 12:14:40 PM
 ROST Unit: III

Operator: Daniel Garza
 Fugro Job #: 04.0911-0010
 Max fluorescence: 1.84% @ 1.42 ft
 Final depth BGS: 66.42 ft

FPB-11

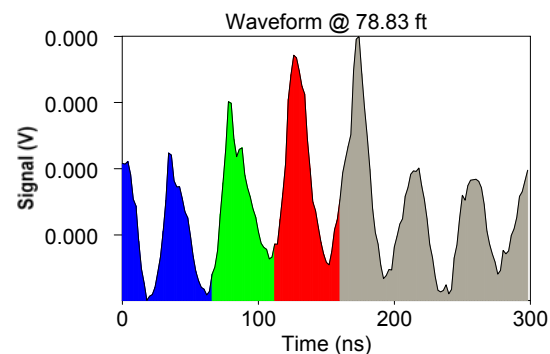
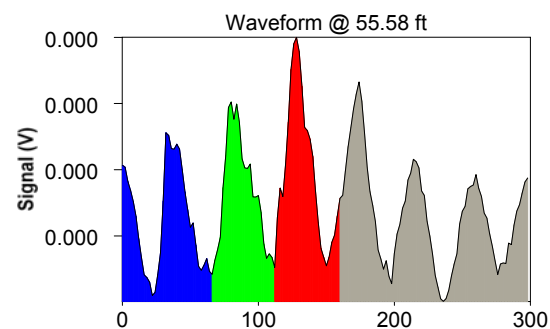
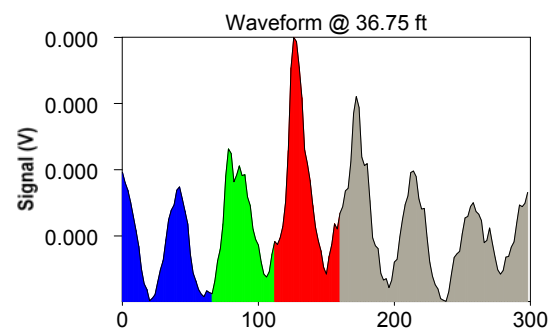
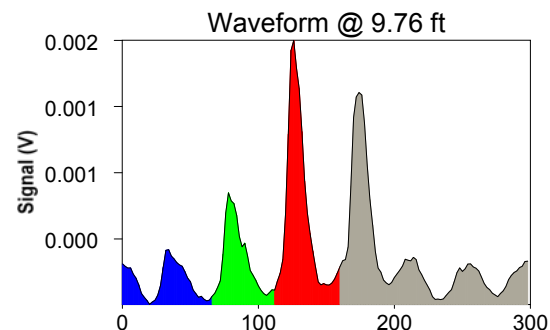
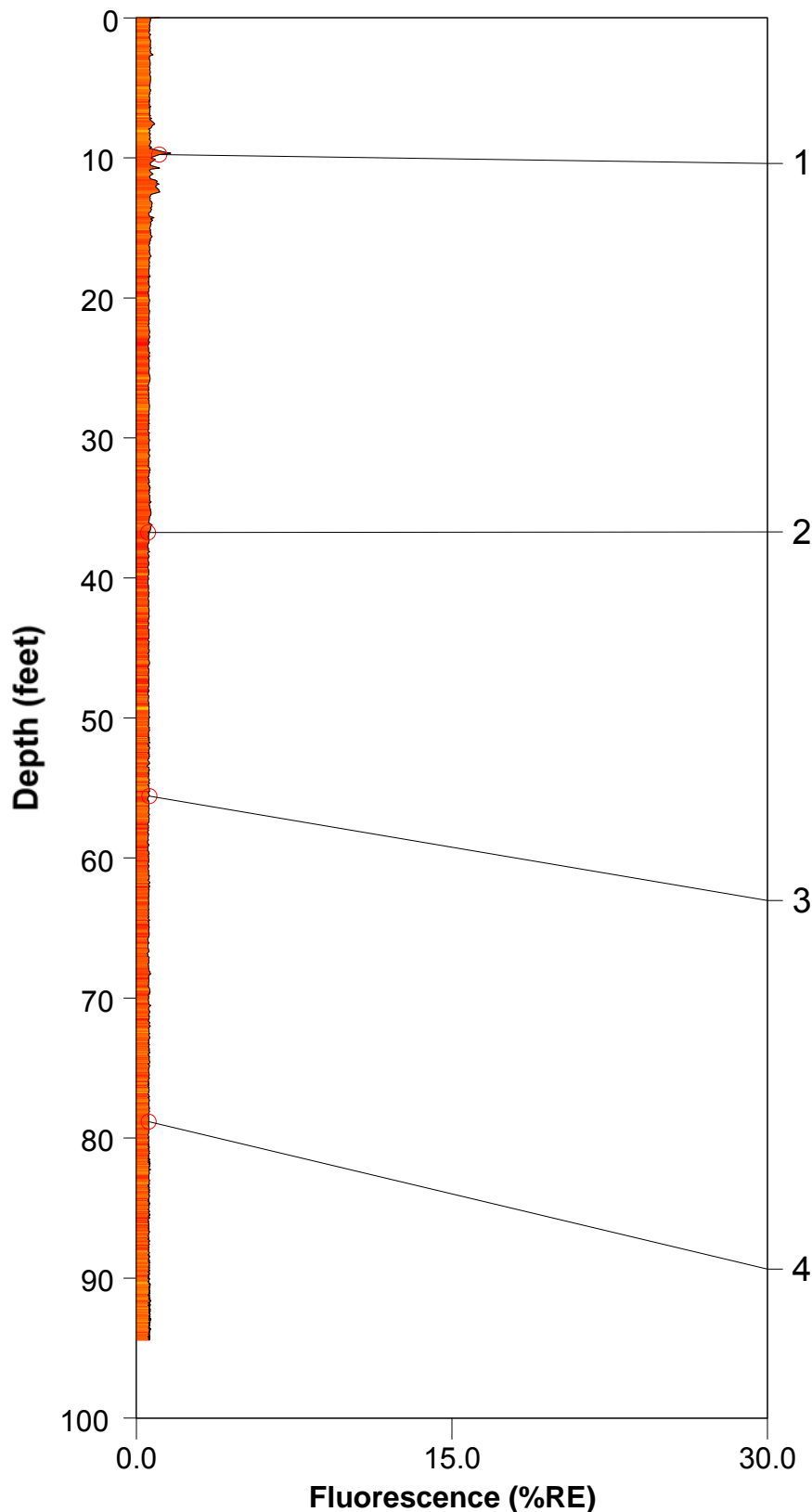


ROST Fluorescence Response Data

Site: Cenco Ref. Santa Fe Springs, CA
 Client: Murex Env., Inc.
 Date/Time: 3/29/2011 @ 2:30:57 PM
 ROST Unit: III

Operator: Daniel Garza
 Fugro Job #: 04.0911-0010
 Max fluorescence: 1.63% @ 9.67 ft
 Final depth BGS: 94.43 ft

FPB-09B

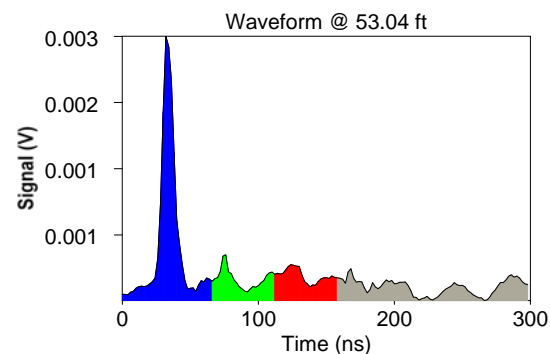
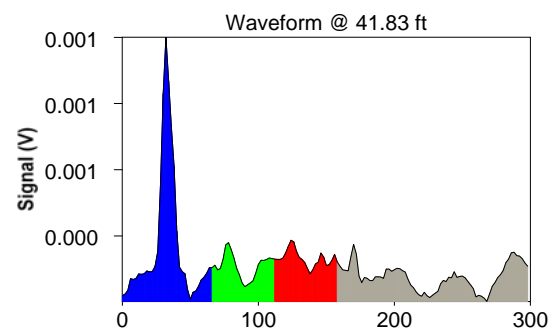
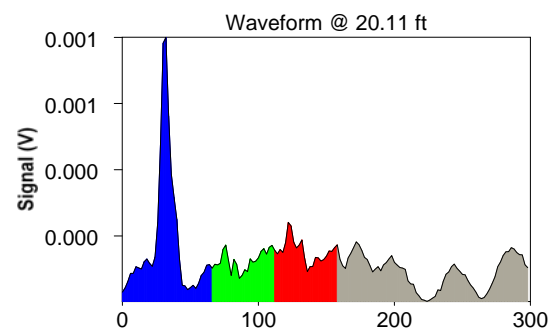
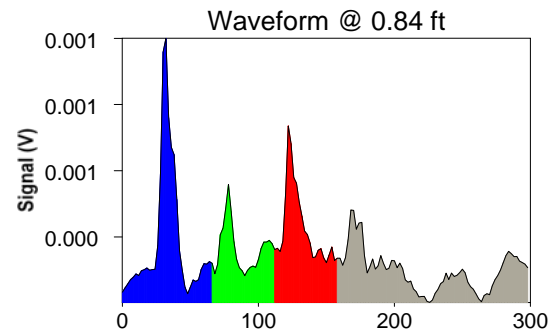
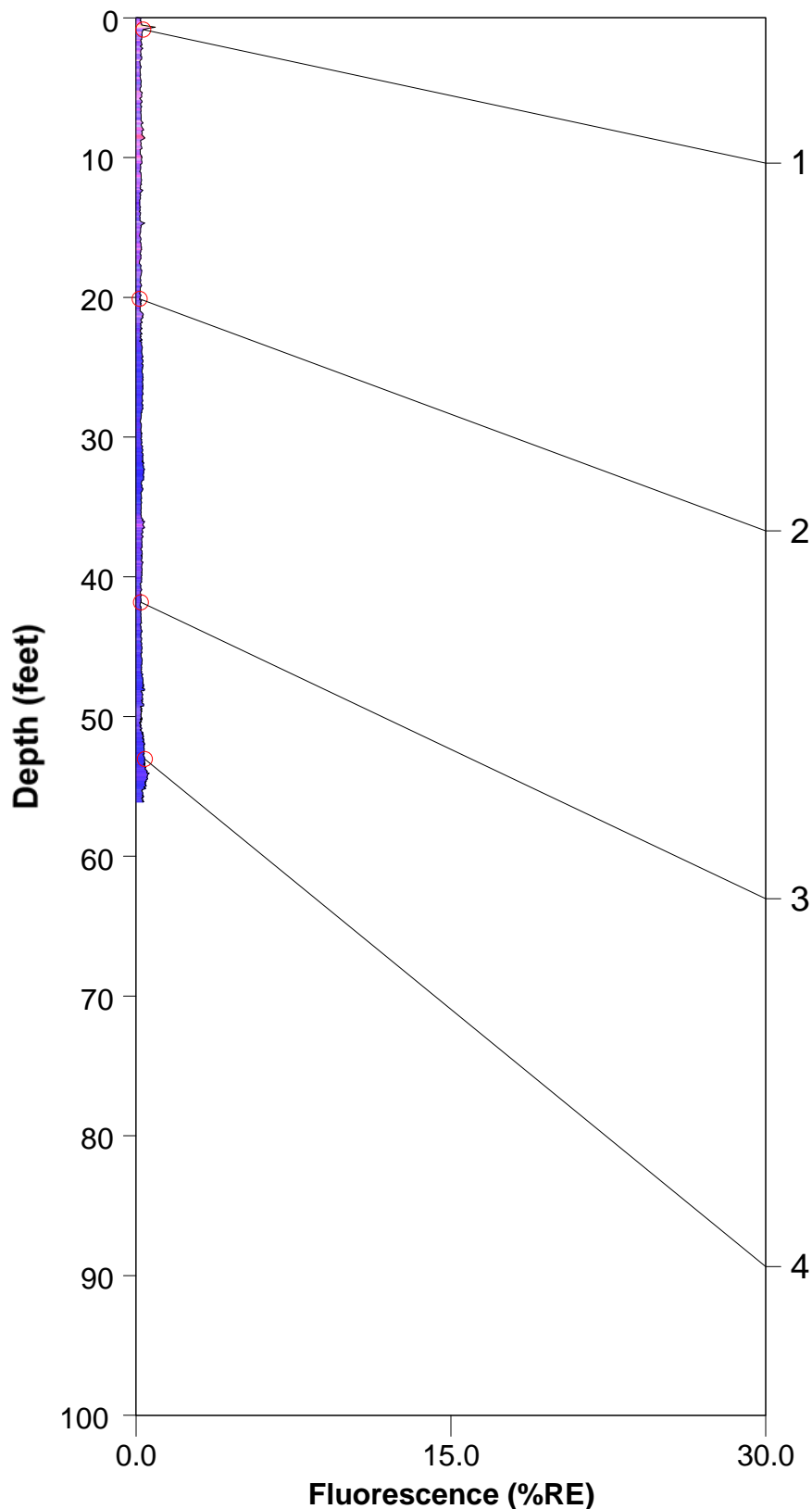


ROST Fluorescence Response Data

Site: Cenco Ref. Santa Fe Springs, CA
 Client: Murex Env., Inc.
 Date/Time: 3/29/2011 @ 9:25:15 AM
 ROST Unit: III

Operator: Daniel Garza
 Fugro Job #: 04.09110010
 Max fluorescence: 0.92% @ 0.67 ft
 Final depth BGS: 56.12 ft

FPB-09

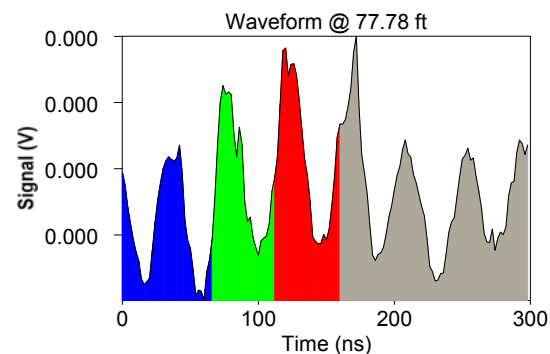
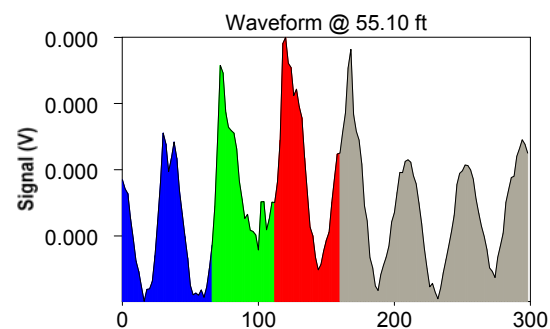
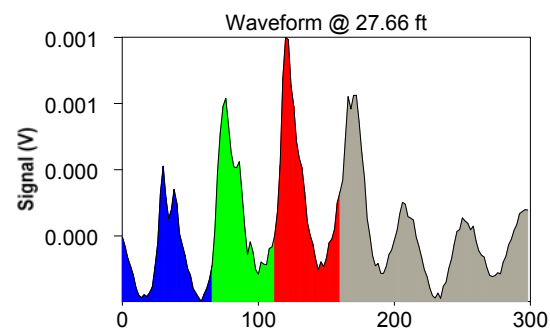
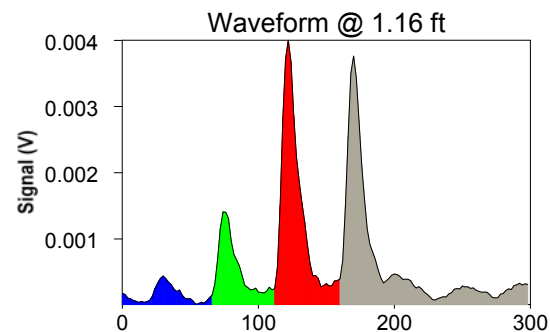
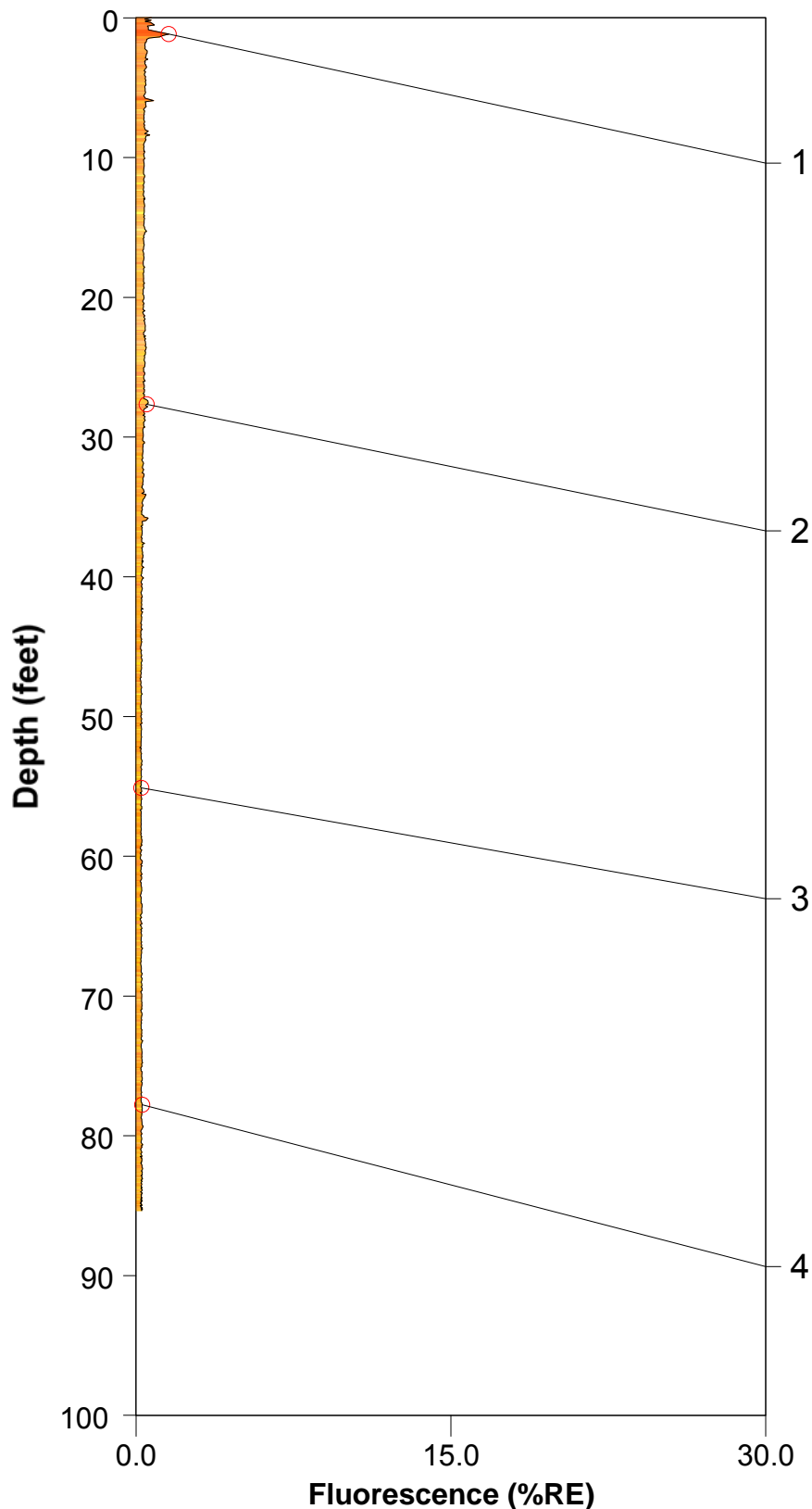


ROST Fluorescence Response Data

Site: Cenco Ref. Santa Fe Springs, CA
 Client: Murex Env., Inc.
 Date/Time: 3/29/2011 @ 12:59:11 PM
 ROST Unit: III

Operator: Daniel Garza
 Fugro Job #: 04.0911-0010
 Max fluorescence: 1.55% @ 1.16 ft
 Final depth BGS: 85.36 ft

FPB-11A



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/22/2009 @ 10:53:52 AM

ROST Unit: 1

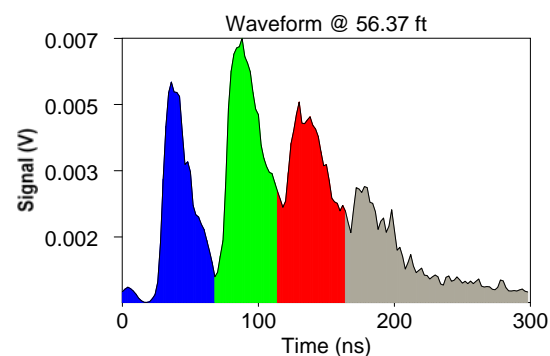
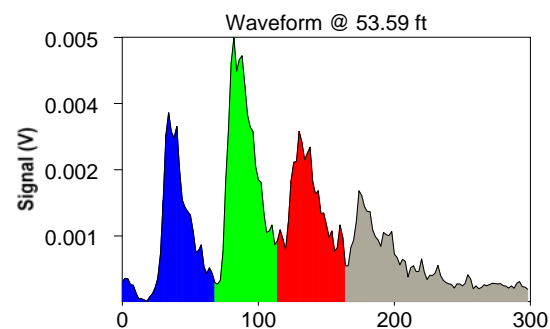
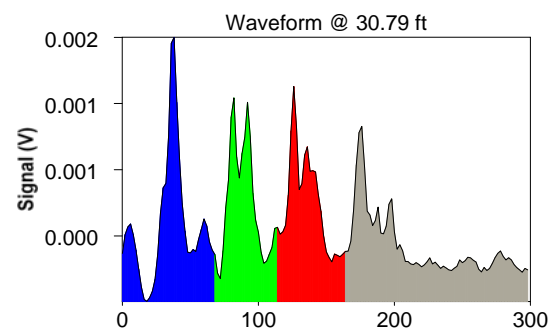
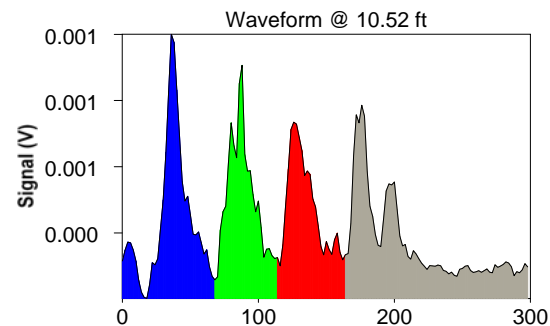
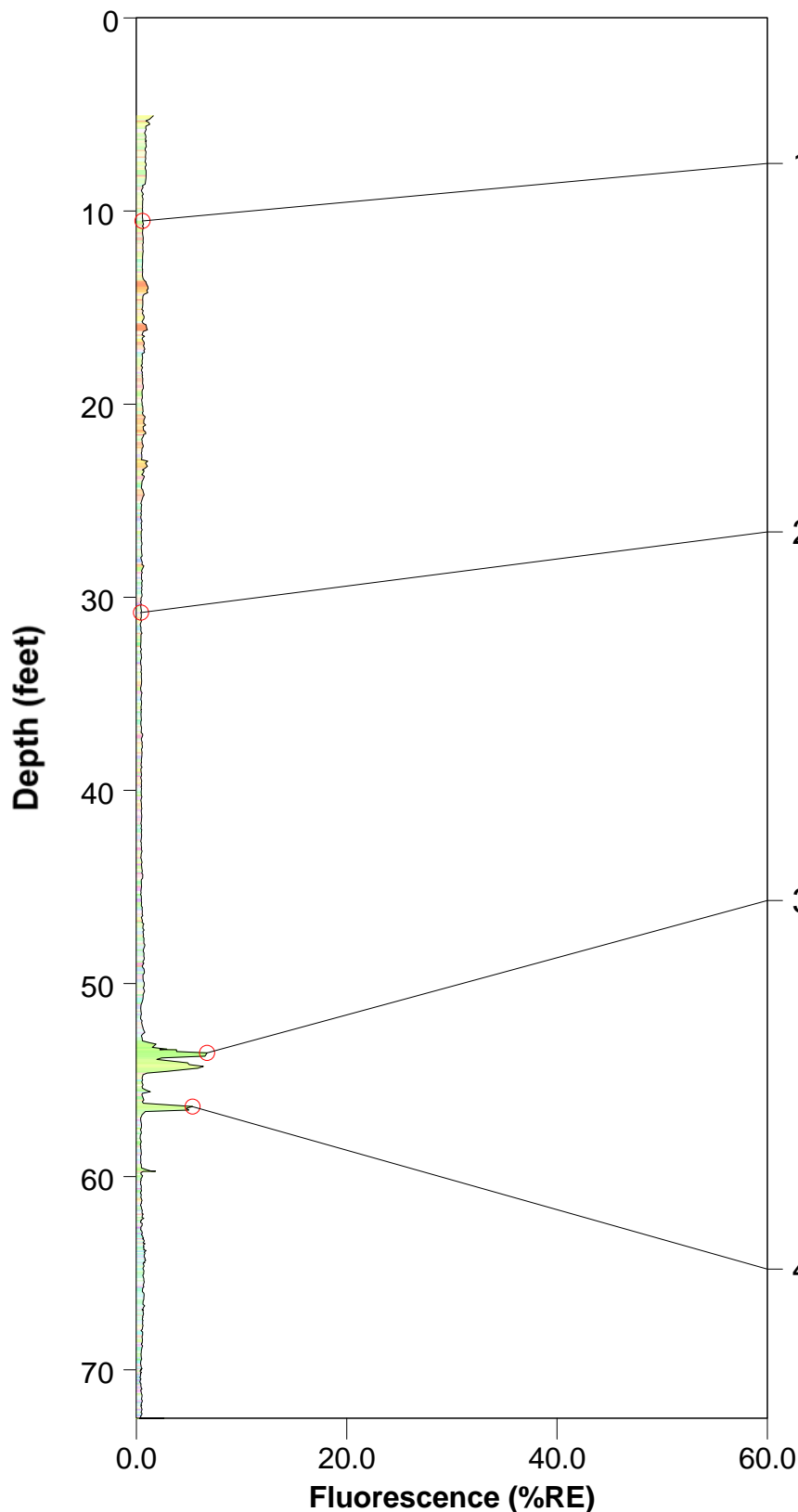
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 6.72% @ 53.59 ft

Final depth BGS: 91.04 ft

FPB-12



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/22/2009 @ 10:53:52 AM

ROST Unit: 1

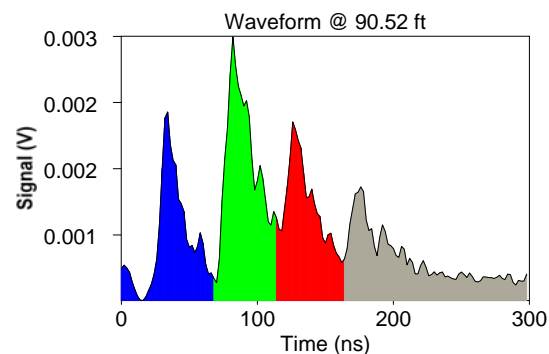
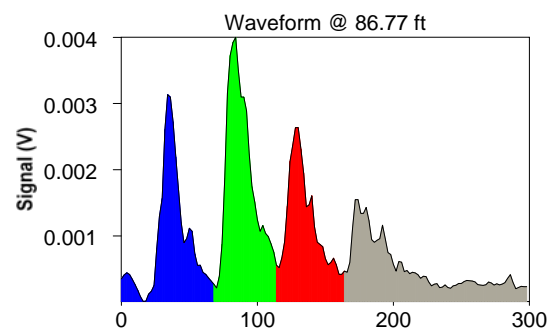
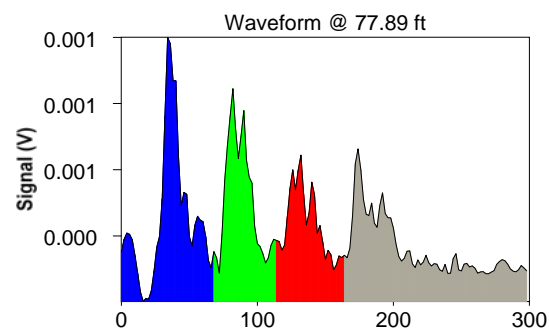
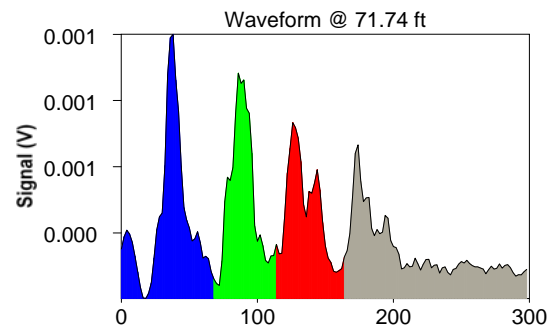
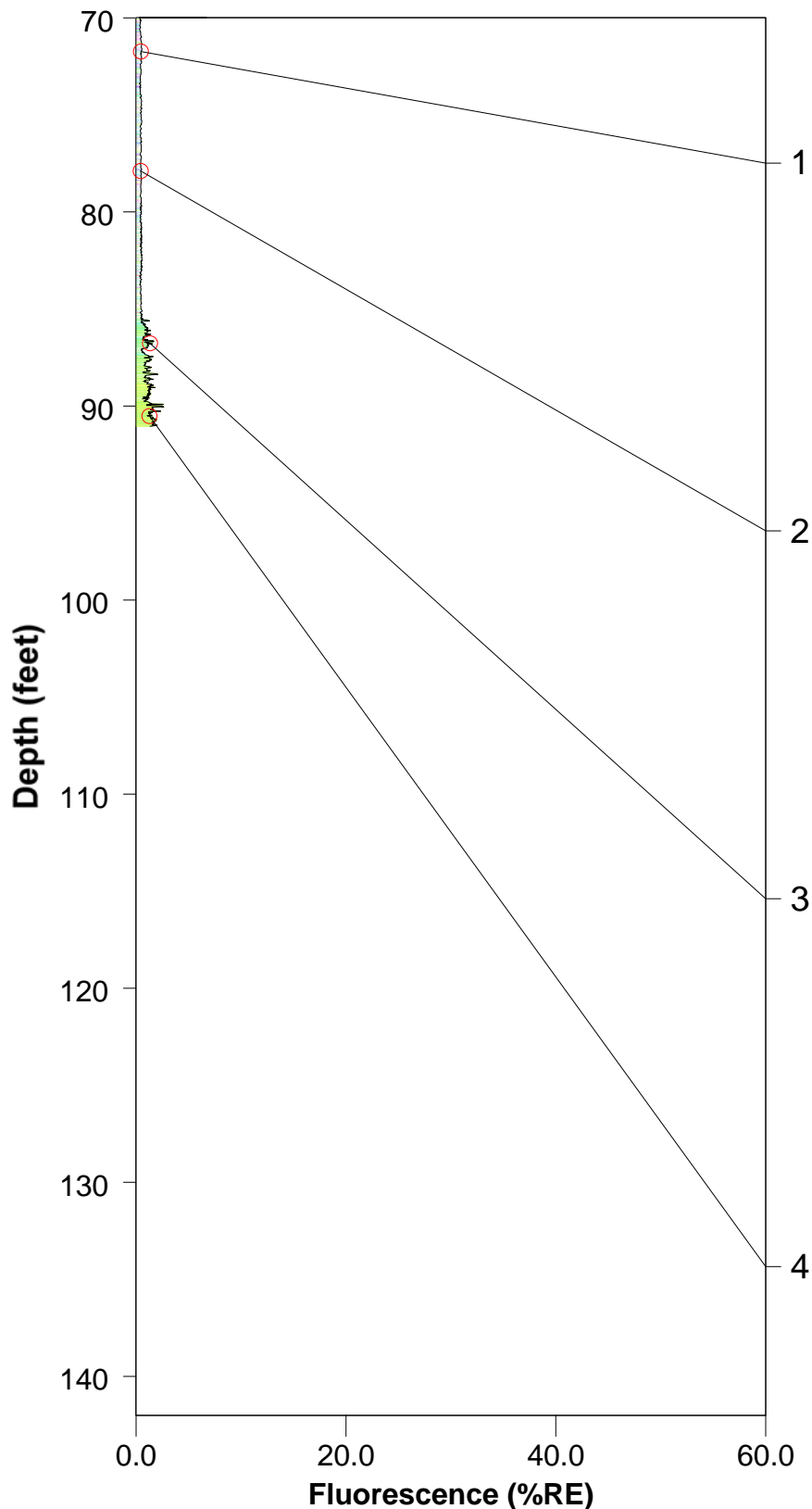
Operator: M. Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 6.72% @ 53.59 ft

Final depth BGS: 91.04 ft

FPB-12



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/24/2009 @ 7:56:08 AM

ROST Unit: 1

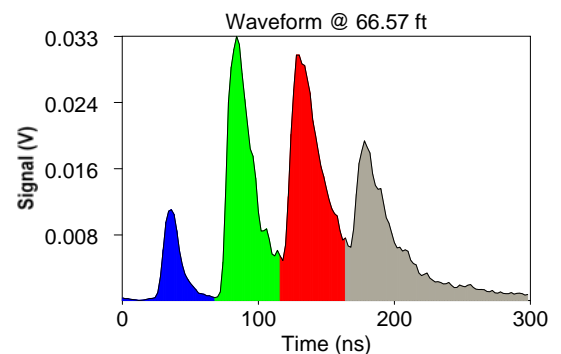
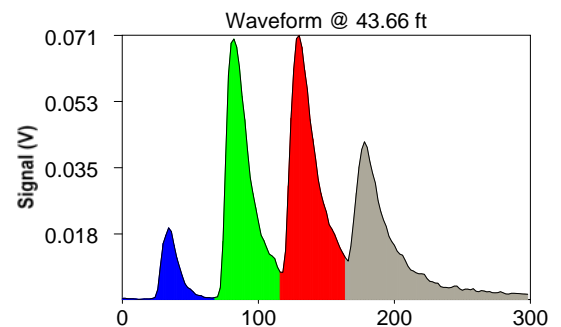
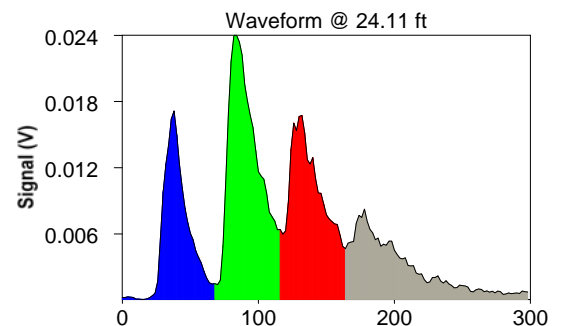
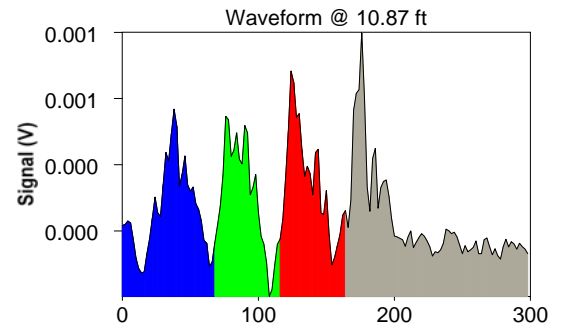
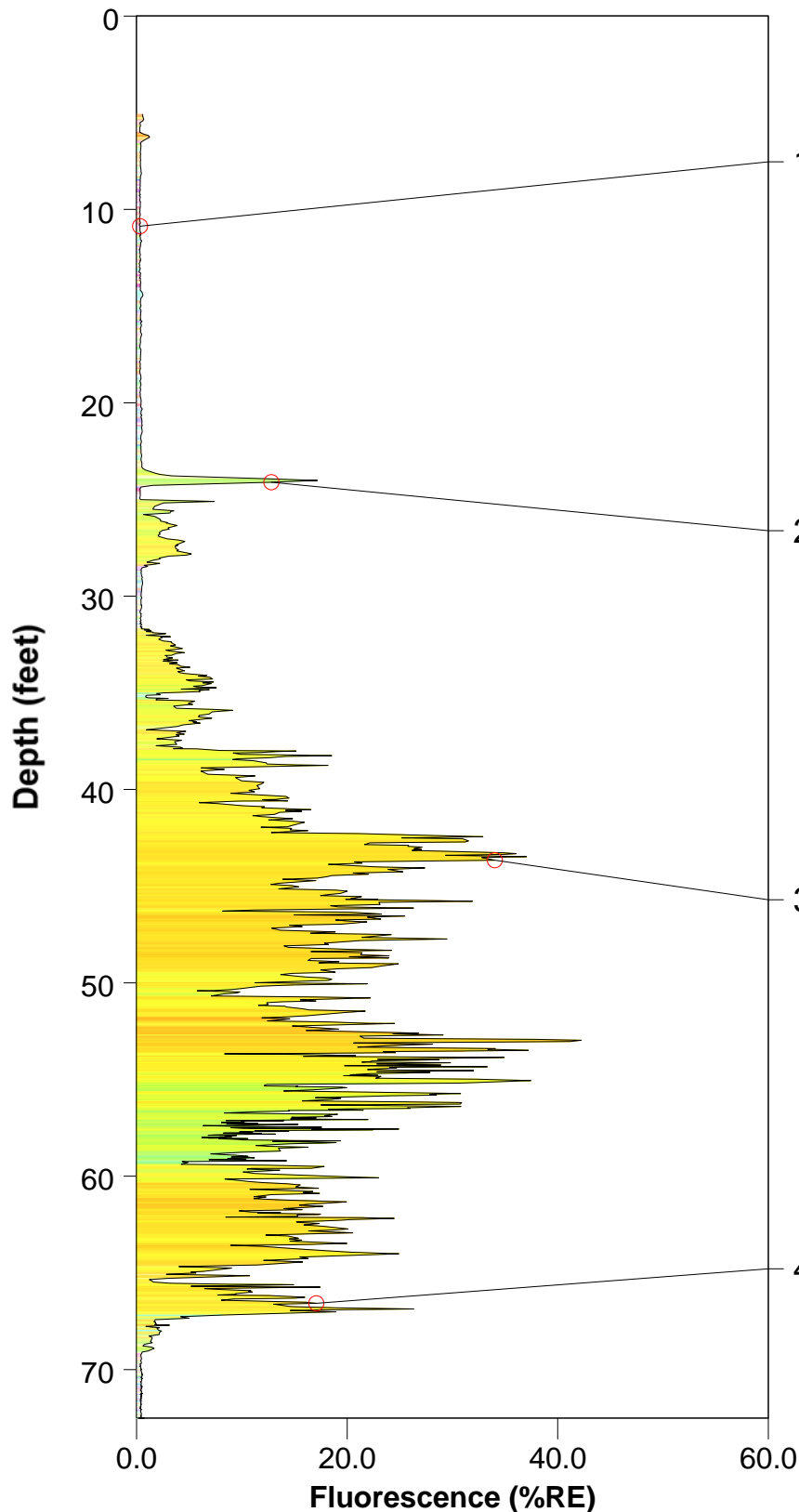
Operator: M, Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 42.21% @ 52.97 ft

Final depth BGS: 102.23 ft

FPB-13



ROST Fluorescence Response Data

Site: Santa Fe Springs, CA

Client: ARCADIS

Date/Time: 7/24/2009 @ 7:56:08 AM

ROST Unit: 1

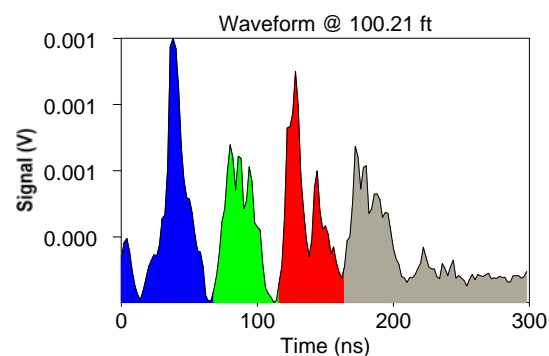
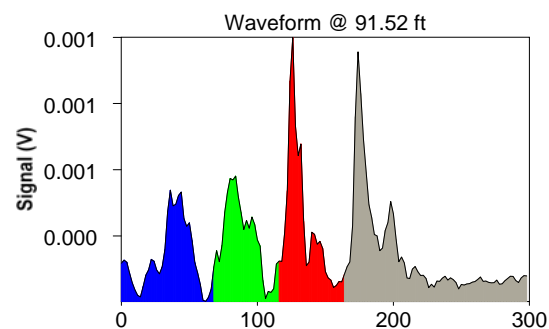
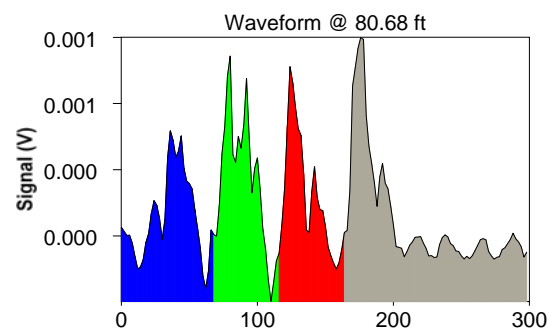
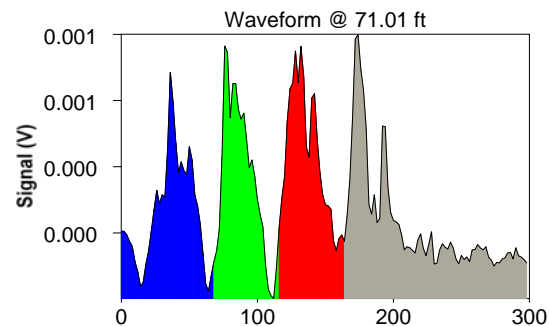
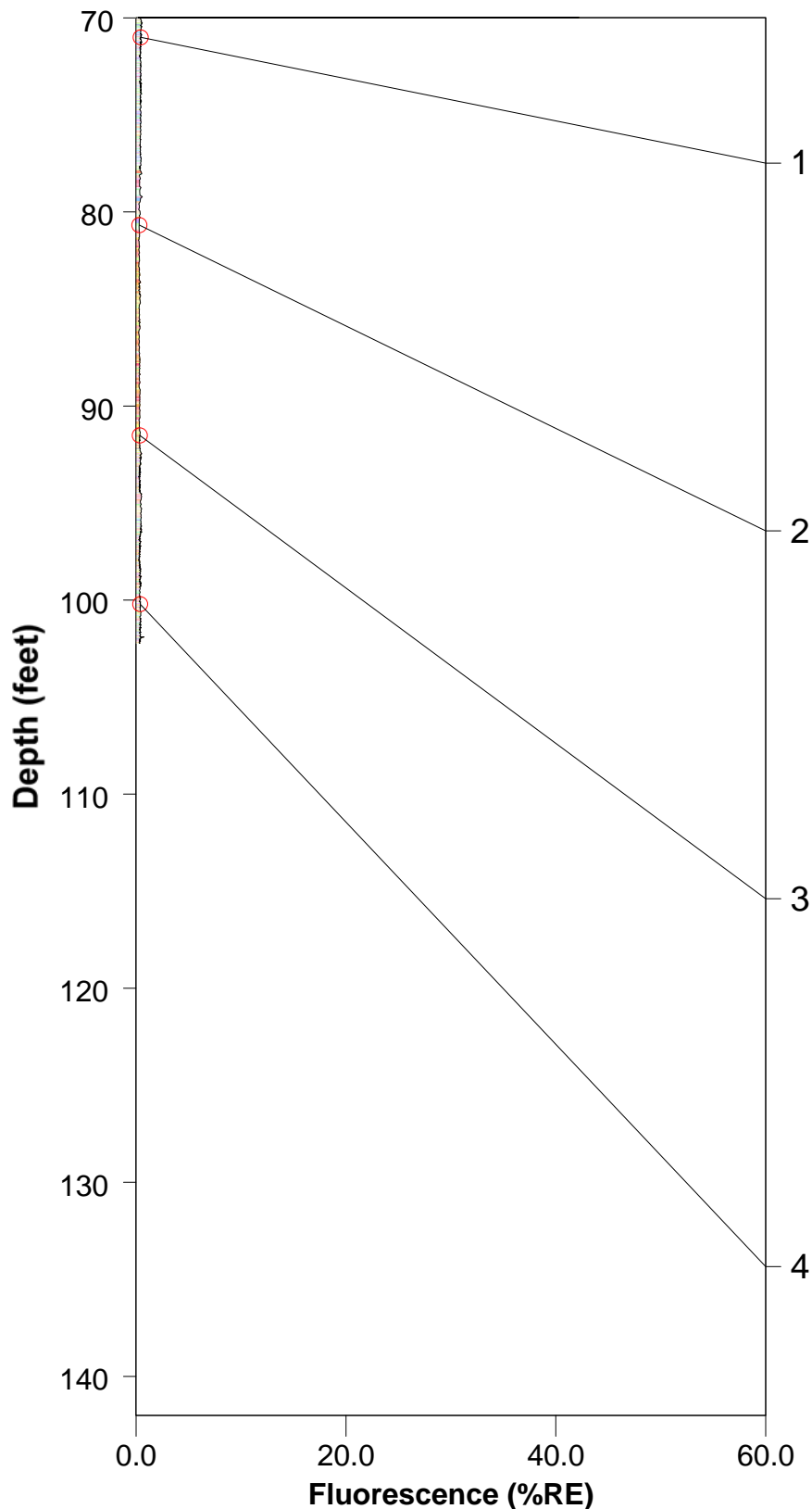
Operator: M, Parras

Fugro Job #: 04.0909-0040

Max fluorescence: 42.21% @ 52.97 ft

Final depth BGS: 102.23 ft

FPB-13



ROST Fluorescence Response Data

Site: Cenco Ref. Santa Fe Springs, CA
 Client: Murex Env., Inc.
 Date/Time: 3/29/2011 @ 4:44:39 PM
 ROST Unit: III

Operator: Daniel Garza
 Fugro Job #: 04.0911-0010
 Max fluorescence: 1.52% @ 26.48 ft
 Final depth BGS: 79.45 ft

FPB-14

